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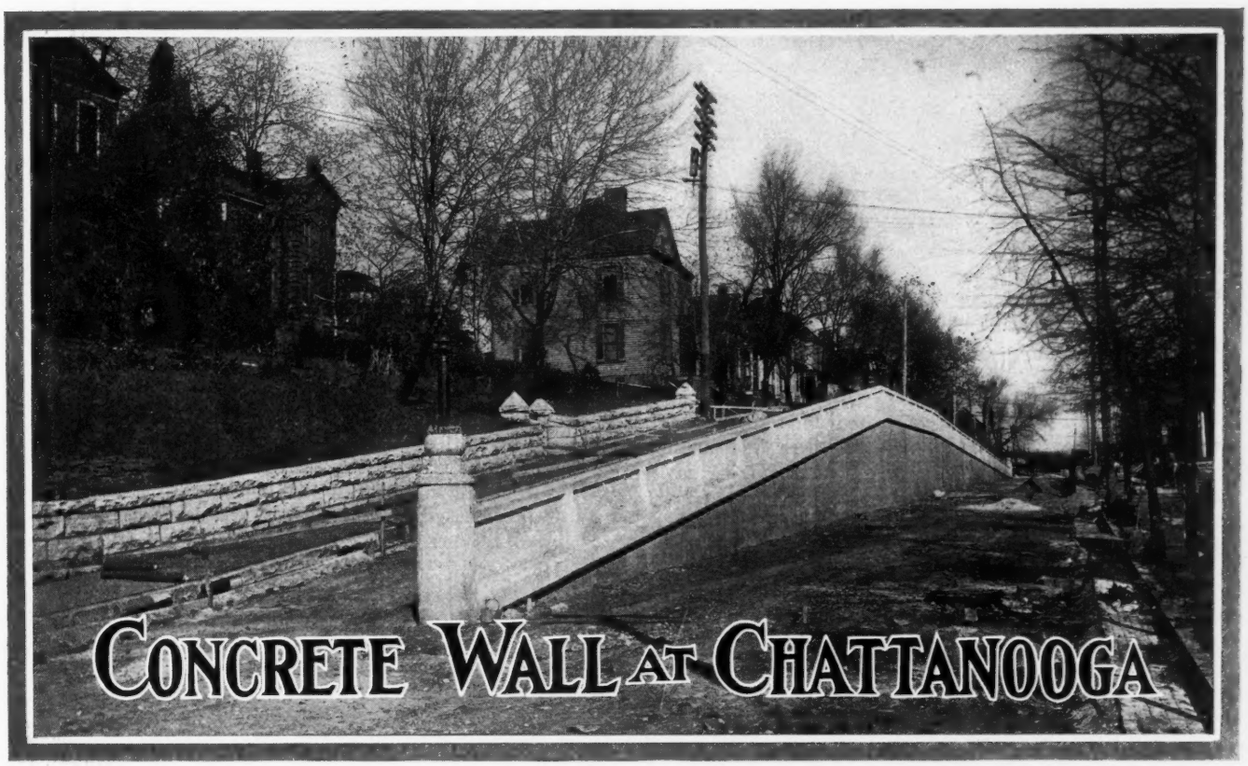
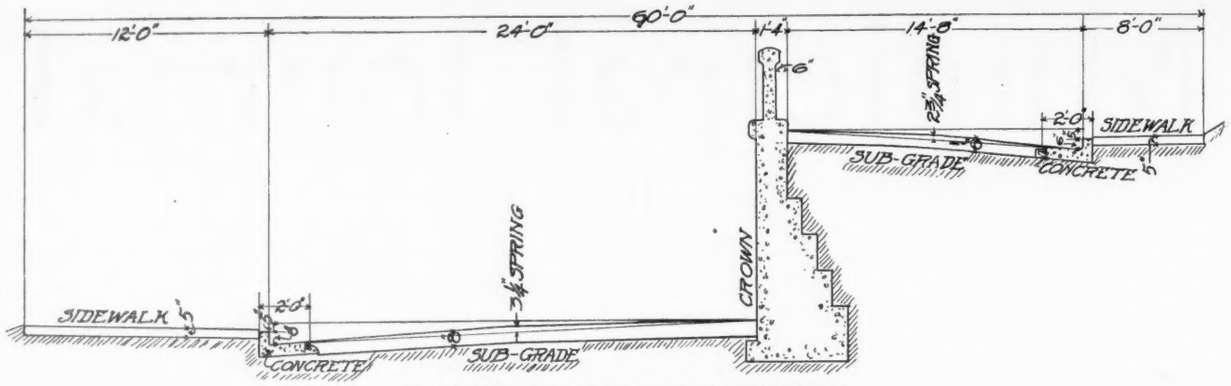


GENERAL VIEW OF WALL, UPPER AND LOWER ROADWAY, LOOKING NORTH

THE following is a description of a construction which is just nearing completion at Chattanooga, Tenn., for meeting one of the most difficult problems which confronts the engineer in the construction of streets on steep hillsides. One of the principal residence streets of that city is Houston street, to the west of which the ground rises quite rapidly, falling away with a gradually flattening grade to the east. The street itself follows approximately one of the contours and in general its grades are not at all excessive. At one point, where it is crossed by Fifth street, a ridge lies approximately at right angles to Houston street, Fifth street occupying practically the highest line of the ridge. This ridge practically terminates right at Houston street, the grade of Fifth street falling very rapidly from the west side of Houston to the east side, there being a drop of about 6 feet between the west and the east curb. It was, of course, impracticable to make anything like ordinary roadway construction with one side of the street so much higher than the other; and as a matter of fact this was not attempted, but teams passing along Houston street kept close to the east curb and passed around the foot of this steep knoll. Those desiring to pass from Houston into Fifth Street kept along the west curb, climbing a 10½ per cent grade onto the ridge.

Ordinarily the solution of such a problem would be to grade off the ridge entirely in Houston street, which would have meant a cut of 6 feet on the west curb, and to increase the grade of Fifth street to the west for, say, one block where the new grade would be brought out even with the existing one. There were two objections to this method in this case, however. One was that both Houston and Fifth Streets at this corner were occupied by residence properties of considerable value and the city would undoubtedly have had excessive damages to pay. Possibly even more serious was the fact that the grade of Fifth street was already 16.8 per cent, which was just about practicable for light wagons, such as delivery wagons and carriages.

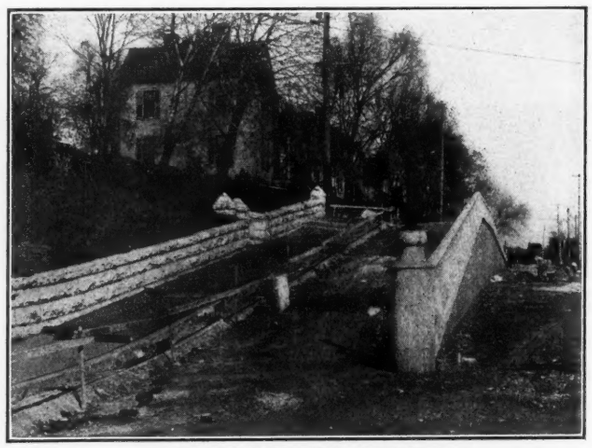
Under these conditions City Engineer Robt. Hooke has for a number of years been advocating the construction, which was finally adopted and which is now completed except for the paving of the roadway. This consisted in dividing Houston street lengthwise at the point of difficulty into what is practically two streets, the easterly portion being carried past Fifth street at a uniform grade of 1.6, while the westerly side rises from the south with a grade practically unchanged from the original west curb grade, and from the north the approach is much flatter, a uniform grade being substituted for the former ir-



CROSS-SECTION OF STREET AS IMPROVED

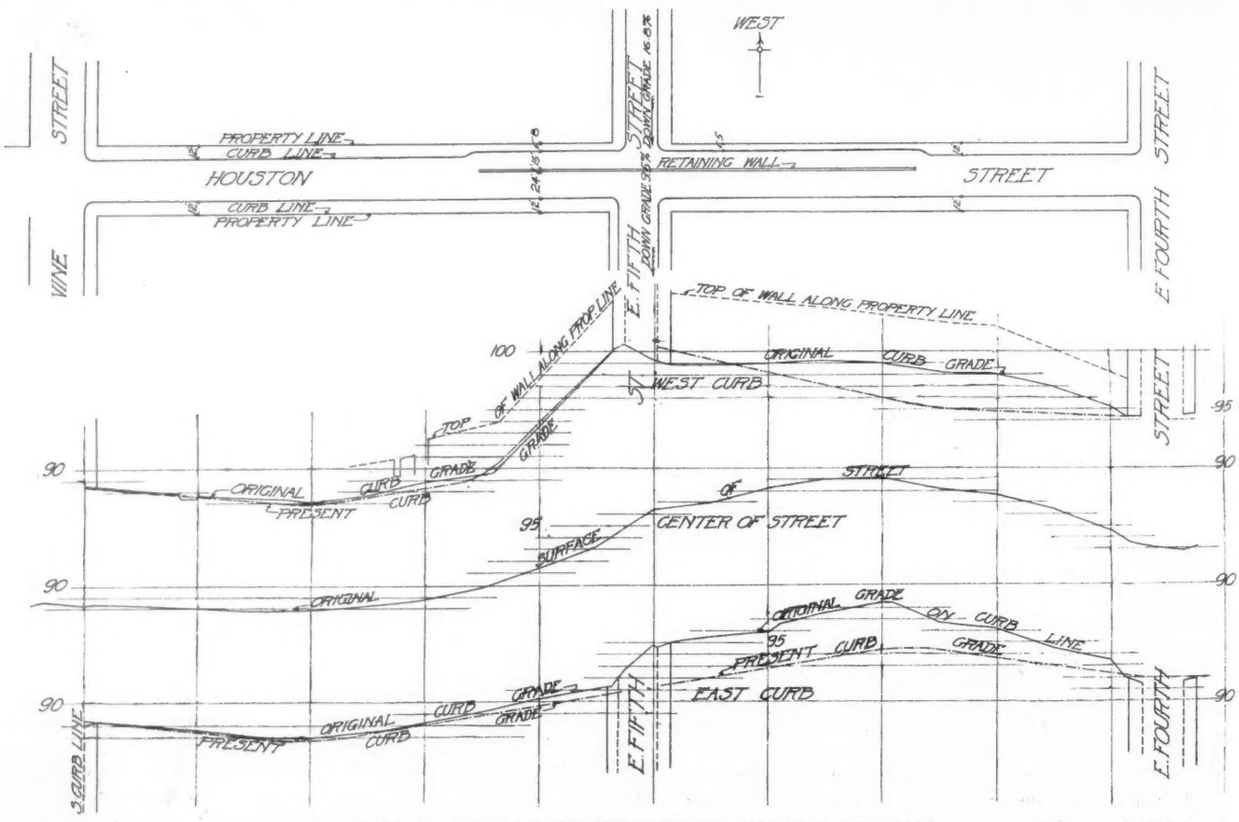
regular one. These two sections of Houston street are separated from each other by a wall which serves as a retaining wall for the approaches to Fifth street on the west. The division of roadway space and also of sidewalk space was not equal between these two parts, as the amount of traffic passing along Houston street will be greater than that passing between Houston and Fifth streets. Consequently the 60-foot street was so divided as to give the east sidewalk 12 feet—the original width—the east roadway 24 feet, the west roadway 14 feet 8 inches and the west sidewalk 8 feet, the additional one foot 4 inches being the thickness of the wall above the upper roadway.

This construction has required considerable cutting along the west sidewalk, but not nearly as much as would have been the case had the entire width of Houston street been carried down to a practical grade and ordinary cross-section. Along the east curb there was practically no excavation south of Fifth street, but for 200 feet north of Fifth there was an almost uniform cut of 3½ feet, which tapered out to nothing 200 feet further north. This lowering of the sidewalk, however, has really resulted in an improvement of the property, as the houses sat well back from and somewhat below the sidewalk and the

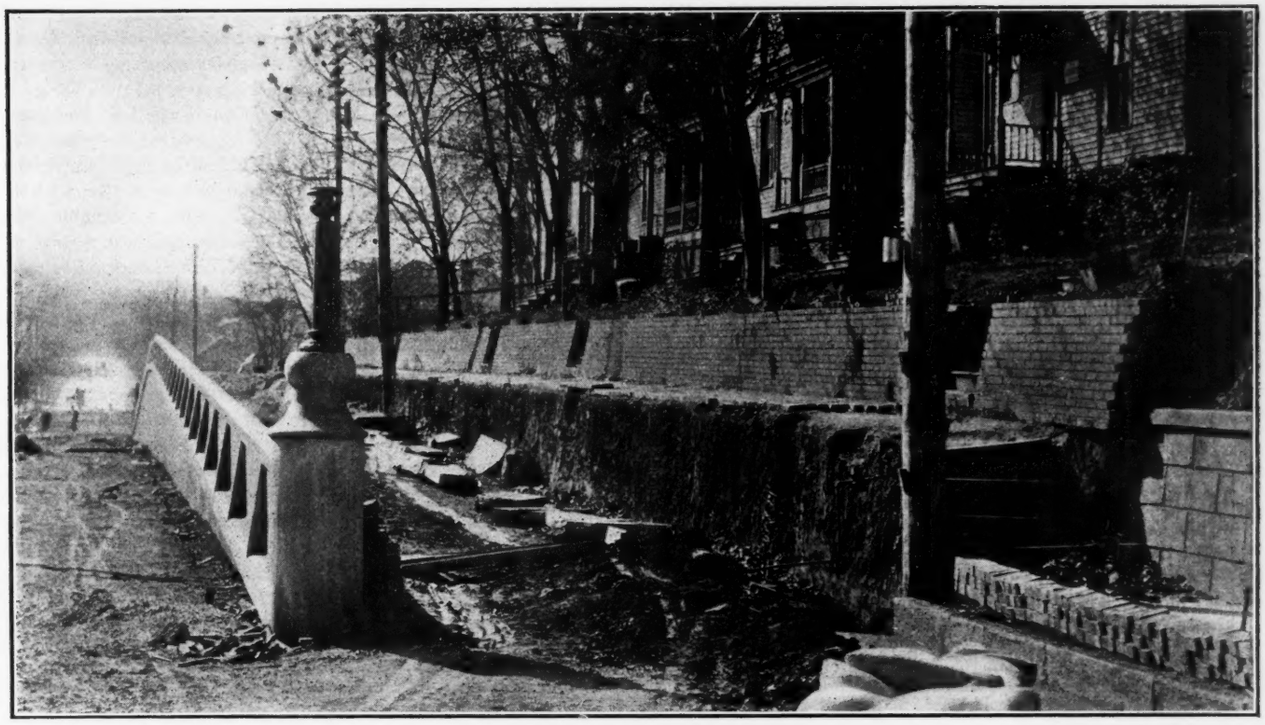


UPPER ROADWAY, LOOKING NORTH

lawns were terraced along the property line. On the west line the solution was not so easy. South of Fifth street there was



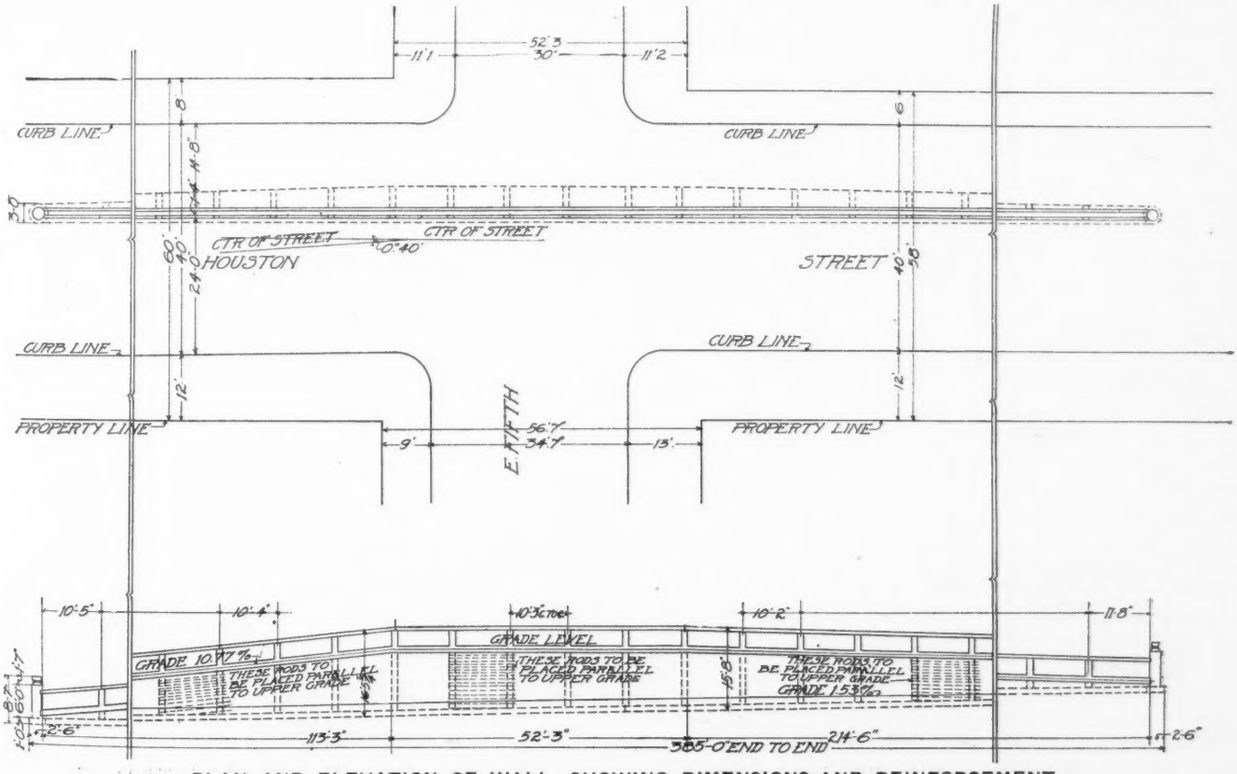
PLAN AND PROFILE OF STREETS IN VICINITY OF WALL



LOOKING SOUTH FROM CENTER OF LOWER ROADWAY

a change of only 2 or 3 inches at certain points, made to secure a uniform grade; but at the north, where a retaining wall from 4 to 6 feet high along the property line has existed for years and the lawns of the residences slope quite rapidly up from the top of this, the cutting required reached a maximum of a little over 3 feet, tapering out to nothing at Fifth street and beyond the north end of the wall. As yet the owners have not done anything toward lowering their sidewalks, and as shown in the illustration these still stand several feet above the roadway; even the water meters still remain elevated on the risers as they were constructed for the use of outdoor meter boxes. What will probably be done cannot yet be stated, whether the sidewalk will be lowered and a higher retaining wall be built along the property line, or whether they will retain their present elevation and a second retaining wall be built between the roadway and sidewalk.

This solution of a difficult problem of grading at street intersections, while not unprecedented (we have seen a similar construction at Lyons, N. Y., and possibly others could be found in other cities) is at least an unusual one and in this instance



PLAN AND ELEVATION OF WALL, SHOWING DIMENSIONS AND REINFORCEMENT

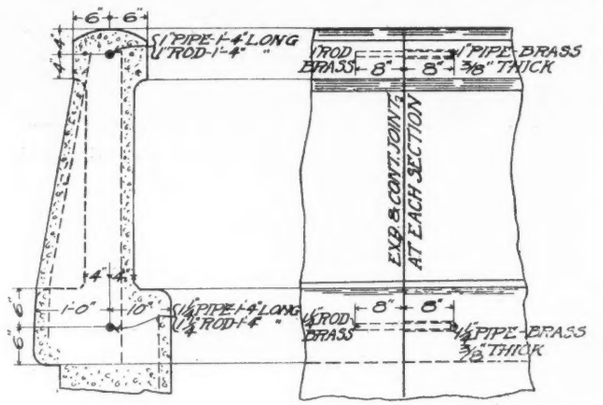
would seem to be the best practicable solution, all conditions considered.

The wall and sidewalks were constructed entirely of concrete, the wall being reinforced. Alternative plans were made and bids were received for both reinforced and unreinforced concrete wall. These bids were opened on April 20th of this year and were as follows:

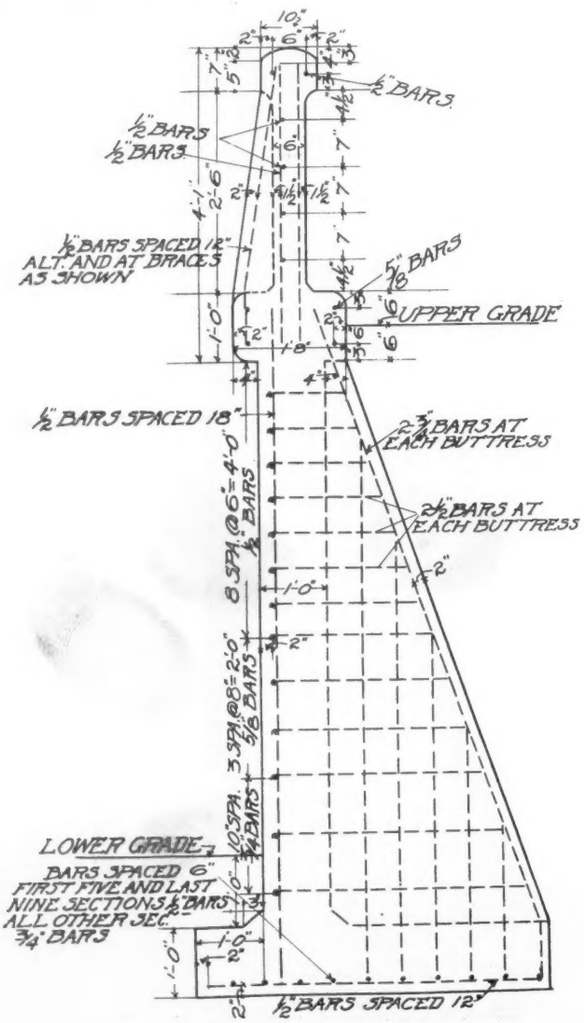
Item	West Construction Co.	Schillinger Bros. Co.	E. P. Norris	Chamberlain-Freeman Co.
Retaining wall, complete, reinforced	$3,233.00	$4,479.00	$4,707.00	$3,650.00
Retaining wall, complete, gravity section	3,333.00	.....	4,497.00	3,550.00
Extra concrete, estimated 1 cu. yd.	6.75	10.50	9.00	6 90
" steel bars, estimated 100 pounds @	.05	.03	.04½	.04½
Earth excavation, estimated 100 cu. yds. @	.60	.50	.79	.70
Totals { Reinforced	$3,304.75	$4,542.50	$4,799.25	$3,731.40
Totals { Gravity	3,404.75	.....	4,589.50	3,631.40

It will be seen from this that the bid for the wall using reinforcement was just $100 less than that for the gravity section in the case of the lowest bidder, who was awarded the contract for a reinforced wall. On the other hand the other two bidders who bid on both sections bid higher for the reinforced wall, $100 in one case and $210 in the other. It would therefore appear that in this particular case there was very little difference in the cost of the two methods of construction, in the estimation of all the bidders. These bids include the steel bars and everything pertaining to the construction of the wall except the excavation, for which a separate bid per cubic yard was received. The excavated material was the red clay found throughout that territory. This contract did not include the sidewalk or the roadway, for which separate bids were received August 31, which work is now under way.

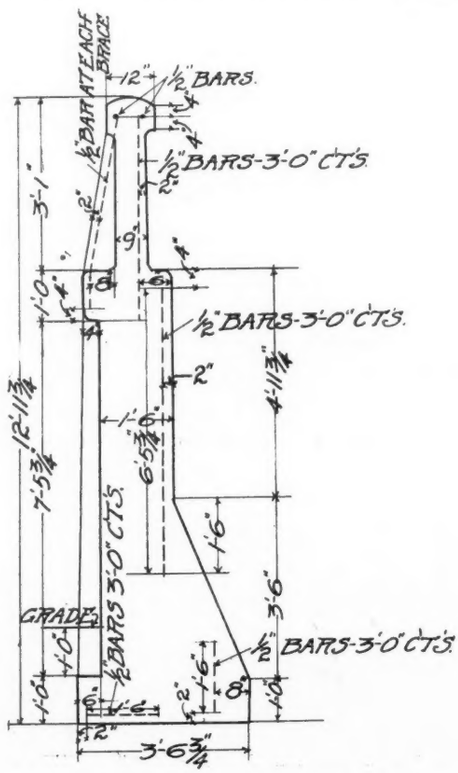
The accompanying cross-sections of the walls and the elevation of the same show the general dimensions of the reinforced wall as built. Where the wall is highest the footing or base is 6 feet wide, one foot of which extends in front of the wall, the portion extending under the fill varying with the height. The wall proper, or face plate, is one foot thick up to the top of the fill, and is reinforced with buttresses spaced 10 feet 2 inches to 10 feet 4 inches between centers. Surmounting this wall is a parapet 3 feet one inch high above a 12-inch coping, which also is strengthened with buttresses or braces placed upon the outside at the same points as the main wall buttresses. The typical section shows the sizes and spacing of bars used. The bars were all Johnson corrugated bars and were wired together at all intersections. The concrete was all mixed in a batch mixing machine and was deposited quite wet in wooden forms, exposed surfaces being smoothed down as soon as the concrete was set sufficiently for the forms to be removed. That for the main wall and buttresses was mixed 1:3:6 and that for the parapet 1:2:4. The wall stood for six weeks before any back filling



SECTION OF WALL AND EXPANSION JOINT, UNREINFORCED CONCRETE


½" BARS
½" BARS
½" BARS
½" BARS SPACED 12" ALT. AND AT BRACES AS SHOWN
⅝" BARS
UPPER GRADE
½" BARS SPACED 18"
2½" BARS AT EACH BUTTRESS
2½" BARS AT EACH BUTTRESS
8 SPA. @ 6"=4'-0" ½" BARS
3 SPA. @ 8"=2'-0" ⅝" BARS
10 SPA. ¾" BARS
LOWER GRADE
BARS SPACED 6" FIRST FIVE AND LAST NINE SECTIONS ½" BARS ALL OTHER SEC. ¾" BARS
½" BARS SPACED 12"

TYPICAL SECTION OF WALL WITH REINFORCEMENT

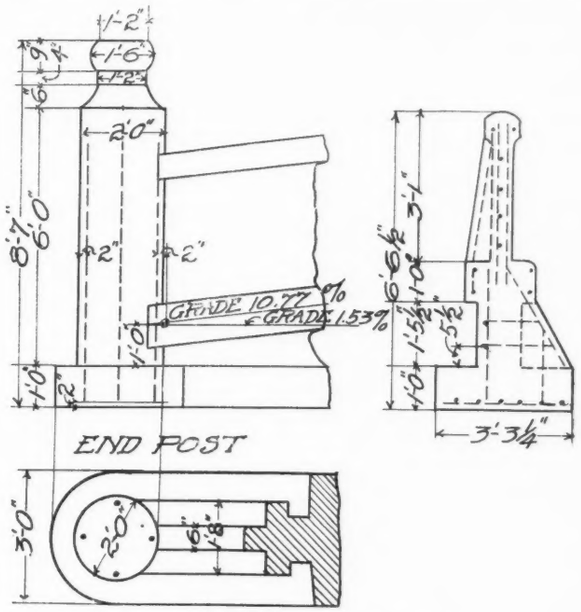


SECTION OF WALL WITHOUT REINFORCEMENT

was done, and this was then carried on by the city, the material being placed and tamped in 4-inch layers. These layers were given a slope away from the wall.

In the plan for a wall without reinforcement, expansion joints were provided for at intervals, the alignment of the wall being maintained by brass rods fastened in the concrete on one side of the joint which extended across the joint into brass pipes set in the opposite portion of the wall. It was not thought necessary to provide expansion joints in the reinforced wall, however, as it was believed that the steel reinforcement would prevent local contraction cracks.

No weep holes were left in the wall, both because of their unsightliness and because of the wash of the lower roadway which would probably result. (This roadway pitches from the wall toward the gutter on the east side.) To provide for drainage, however, a 4-inch drain tile was laid with open joints just back of the footing for the entire length of the wall, at the lower end of which it discharges into a catch basin. As the buttresses prevented this drain from being laid directly at the bottom of the wall proper, there was carried from this drain across the top of the footing to the main wall, in each bay, a 4-inch off-set pipe, which at the wall turned up with a 90-degree bend in which rested a vertical branch either 4 or 6 feet



PLAN AND ELEVATION OF END POST

high (depending upon the height of the wall), in the top of which vertical branch was placed a vitrified disk which was uncemented. As all the joints in this system of drains were left uncemented it is believed that any seepage water reaching the rear of the wall will be completely removed.

The sidewalks on each side of the street are of cement, the curbs of granite and the gutters of paving brick; and the roadway will be of chert macadam, which is the standard construction for non-permanent pavements in that city. At each end of the wall is a post of concrete, surmounting which is an iron post of simple design for carrying a street gas lamp. A novel feature in connection with these lamps is that it is proposed to provide each of them with an automatic lighting and extinguishing device, which will need to be wound but once a week and can be adjusted to light and extinguish the lamp at any desired times.

The entire wall, as appears from the illustrations, is simple of design and is not burdened with any attempts at ornamentation, the only reliefs being the coping of the main wall, that of the parapet and the buttresses of the latter. The appearance of the whole is that of solidity and strength, the proportions are well considered and the effect is pleasing.

CONCRETE PAVEMENT IN BOISE

Work Now Being Done by Contract—Materials Used and Method of Construction—Expansion Joints—Cost of Material and Contract Prices

By J. B. MARCELLUS, City Engineer

Abstract from a paper read before the American Society of Municipal Improvements.

Two years ago the Street Commissioner of Boise, Idaho, built a number of sidewalks of just concrete, without any frills, marks or creases. The crossings were 6 inches to 8 inches thick, 5 feet wide, and of a 1-to-8 river run mixture, and the top was smoothed off with a shovel. These crossings were built exceptionally high, as it is the Street Commissioner's duty to keep the crossings clean, and he doesn't own an auto. Being built high, they receive the thumping of everything that crosses them, and to-day there is not a mark or sign of wear on them. One year ago an alley, which is back of the opera house, a large furniture store and numerous other business houses, was paved in a manner similar to the crossings, except being laid in two layers, with the bottom layer a 1-to-10 mixture and the top a 1-to-7 mixture. So far, this paving has shown no signs of wear.

This year it was decided to try concrete pavement on a larger scale, so eight and one-half blocks are now being laid on Front Street. Front Street is parallel to the railway freight yards, where warehouses and the freight depot face on the street, as also does the hay market and electric interurban freight depot. The traffic is consequently slow, but heavy. The width of pavement is 69½ feet. The reason for this width is because on the south side no sidewalk or curb is required because teams drive directly up to the warehouses, and, the street car tracks being laid in the center, the north sidewalk and curb are narrowed to 10½ feet.

The usual bond for performance and quality of work was entered into, but no guarantee or maintenance agreement was required. The bidder, however, is to protect Boise City against any claims for infringement of any patented article, invention, arrangement or appurtenance that may be used in connection with this work.

The sub-grade so far has been good, as no spongy material has been found and sand in only a few places. As the sand will have little chance of moving, it is considered good foundation. All of the sub-grade is being rolled thoroughly with a 16-ton roller. The specifications require all spongy places to be refilled with gravel.

The cement being used is made at Devil's Side, Utah, and is known as "Red Devil." The standard method of the American Society for Testing Materials governs all tests of cement. A good quality of river sand is being used, very clean, although a little fine, and having 30 per cent of voids as determined by a number of tests. The gravel is excellent. It consists of crushed granite boulders up to 6 inches in diameter, porphyry, rhyolite and various other forms of river wash in a mountainous country. These are screened through a 2½-inch mesh screen and grade up well in size. The gravel is obtained from the bed of the Boise River, and is all passed through a jaw crusher to crush the over-size, but, as in all jaw crushers, "flats" or "pumpkin seeds" over 2½ inches in longest diameter will come through. These are easily broken with a 7-pound hammer, and one man, working only a part of the time, keeps most of the pumpkin seeds broken. A number of tests shows the gravel to contain about 40 per cent of voids.

These materials are mixed in the proportions of 1:3:7 and show a concrete that fills well, which, after thorough tamping, can be smoothed off with a wooden float. No topping or special mixture is required for the top, the specifications requiring only a uniform surface, with no stones larger than one-half of an inch in diameter to show. Sometimes a mixture of sand and cement is used to level up with if the concrete does not tamp down level, or an unusual number of large stones appear on the surface. The final thickness of the pavement is 8 inches. At

present two mixers are being used, one run by a gasoline engine and the other by a motor, at a cost of $22 per month, including moving of connections. Both mixers are small size, but turn out from 30 to 40 cubic yards per day.

Expansion joints of one-half of an inch are provided at the curbing and at every 25 feet at right angles to center line of street. These joints are to be filled with paving pitch. At present they are filled with ½-inch dressed boards. The difficulty the contractor will have in getting the boards out remains to be seen. After the concrete is set sufficiently it is covered with 2 inches of dirt and kept wet for seven days.

The bid, as accepted by the Board of Public Works, was as follows:

Concrete	per	cubic	yard,	$5.29
Excavation	"	"	"	.48
Excavation below subgrade	"	"	"	.55
Refill below subgrade	"	"	"	.85

The gravel and sand costs 80 cents per cubic yard delivered. The cement costs about $2.75 per barrel f.o.b. Boise. Labor is $2.50 for eight hours, and teams $5, although the contractor has sublet the hauling of the gravel and sand at 60 cents per cubic yard. We are keeping an accurate account of costs, but can hardly give any details as yet. At the contract prices the cost of the pavement will be about $1.51 per square yard. The other pavements in Boise have cost $2.50 per square yard and upward, so with this difference in price we can afford to do considerable maintenance.

CONCRETE PAVEMENT FOUNDATION

Advocating Thinner Foundations Except Over Weak Spots—Proportioning Ingredients—Graded Sizes to Save Cement—Poured Concrete Foundations

By GEORGE C. WARREN

Paper Before American Society of Municipal Improvements.

THE writer of a paper recently read before the American Society of Civil Engineers, after commenting on rolled stone pavement foundations if the subsoil is suitable, says of concrete:

> As the concrete is generally from 6 to 8 inches thick, and is spread over a large surface, and not deposited in bulk, as in walls, abutments, etc., it is necessary to take more than ordinary care to obtain good concrete. *A small sand pocket* may make little difference in a large mass of concrete, but *in a sheet like a pavement it may be the cause of a large hole which will ruin the wearing surface and extend with great rapidity under traffic.*

The writer is a firm believer in rolled stone or bituminous foundation in cases where there is a sufficiently solid subsoil, such as gravel, stone, or gravelly clay, which can be rolled solid, but in his twenty-five years' practical experience he has never seen holes in otherwise good concrete foundation of a street pavement which could possibly be attributed to "a small sand pocket" in the concrete, and he cannot believe that such pockets exist in any well-mixed concrete, whether machine or hand mixed.

As to thickness and proportions of cement used in concrete, the writer believes that fully one-third of the thickness of concrete frequently used is a wanton waste and that, aside from the thickness, about one-third of the cement usually specified is used unnecessarily.

As stated by the author of the paper referred to, "Concrete is generally from 6 inches to 8 inches thick," although in the writer's experience more than 6 inches is seldom specified. When he says that in his judgment, *under ordinary conditions of well-rolled subsoil, 4 inches of first-class Portland Cement Concrete is as good for pavement foundation as 4 feet, provided the concrete is not disturbed after it is put in place until thoroughly set,* he is aware that most engineers will, at first thought, controvert the statement; but he has many cases of practical experience to back up his judgment and will cite one. In the year 1907, in Niagara Falls, N. Y., the company with which the writer is connected had a contract for laying bitulithic pavement on several streets, aggregating about 30,000 square yards. The specifications provided for foundation of rolled, broken stone, poured with bitumen. On grading the street, a very weak clay subsoil and many recently filled trenches developed, on account of which the city officials permitted a change to 4 inches of Portland Cement Concrete. Before the surface was laid, or the concrete permitted to be otherwise disturbed, it had become *thoroughly set,* "as hard as a rock," and such that no wagon drawn by horses could break through it. The 12-ton three-wheel road roller used in compressing the bituminous surface made no depression in the foundation. Two years later the writer examined the streets and found them to be in perfect condition, with the exception that two poorly filled cross trenches had settled. As a whole, would 4 feet of concrete have been practically any better than the 4 inches used? But some engineers will say "4 inches of concrete is not sufficient over poorly filled trenches"; to which the answer is, "neither is 6 inches nor 8 inches," and the remedy for such cases is, "properly back-fill your trenches and as an additional precaution, provide an extra 6 inches or even a foot of concrete over and extending a few inches beyond the trench." In other words, "put your extra concrete where it is needed, *i.e.,* over the trench, and don't, on account of the trenches, use several times as much extra concrete over the entire street, on probably nine-tenths of which it is not required." This matter of back-filling and reinforcing trenches is one that is very sadly neglected by both contractors and engineers generally.

Proportions of Concrete Ingredients

In the early days of concrete pavement foundation construction—say, twenty-five years ago—it was the general custom to specify "uniform-sized stone passing — inch ring, free from fine material," in the proportion of one part cement, two parts sand, if natural cement, and three parts sand if Portland cement, and four and six parts respectively of stone.

"Uniform-sized stone," as so specified, has about 40 per cent voids, so that in 4 cubic feet of stone there is 1.6 cubic feet of voids to be filled. The cement is lost in the voids in the sand, so that two parts of stone to one part sand, as specified above, provides enough mortar to fill the voids in the stone and a surplus of about 25 per cent, which was a safe proportion. Subsequently, engineers came to generally accept the fact that it is a mistake to eliminate the fine particles of stone, and that a better concrete can be made by permitting the use of certain proportions of fine stone and a dense mineral aggregate uniformly regulated—say "run of the crusher," with the dust screened out, which yields about 25 per cent voids. But, as a rule, the engineers stick to their old formula of 1:3:6, which with such a stone gives:

6 cu. ft. stone at 25% voids = 1.5 cu. ft. voids,

1 cu. ft. cement to 3 cu. ft. sand = 3.0 cu. ft. mortar,

or twice the amount of mortar necessary to fill the voids. With such a stone, the proportions of 1:3:9 would provide ample cement and yield:

9 cu. ft. stone at 25% voids = 2.25 cu. ft. voids,

1 cu. ft. cement and 3 cu. ft. sand = 3.0 cu. ft. mortar,

or enough mortar to fill the voids and a surplus of 33 1-3 per cent and *fully as strong* concerete as the old 1:3:6 "uniform-sized stone" specifications. Hence the statement above that one-third the cement usually specified in pavement foundations is wasted. The writer believes that the time is not far distant when engineers generally will recognize that the true scientific, the economical specification for concrete pavement foundation is one which provides uniform proportions of Portland cement and sand, or equivalent in crusher screenings (1 to 3) and will *require* that the stone, slag or gravel, of which the mineral aggregate is composed, be so graded as to sizes, that nine parts of stone will make a solid, dense concrete. In the writer's judgment, the best specification along this line which has been brought to his attention is the one adopted by the National

Cement Users' Association at its meeting in Cleveland in January, 1909, as follows:

SPECIFICATIONS FOR PROPORTIONING INGREDIENTS FOR PORTLAND CEMENT CONCRETE FOUNDATION FOR STREET PAVEMENTS

Fine aggregate shall consist of sand, crushed stone, gravel or slag varying in size, passing when dry through a screen with openings ¼ in. in diameter; shall be of siliceous material, clean, coarse, free from vegetable loam or deleterious matter and not more than 6 per cent shall pass a screen having one hundred meshes per linear inch.

Coarse aggregate shall consist of crushed stone, gravel, brick or slag which is retained on a screen having openings ¼ in. in diameter and pass through a screen having openings 3 in. in diameter; shall be clean, hard, durable and free from all deleterious materials.

Mortar shall be made with fine aggregate as above specified, mixed with such proportion of cement as will over-fill the voids in the fine aggregate by at least 5 per cent of such voids.

Concrete shall be made of coarse aggregate mixed with such proportion of mortar made as above specified in sufficient quantity to over-fill the voids in the coarse aggregate by at least 10 per cent.

SURFACE. In the case of brick or other forms of block pavements, the surface of the concrete shall be as smooth as practicable. In the case of asphalt or bitulithic or other sheet pavement, the foundation shall be finished as rough as practicable in order that the plastic surface will as thoroughly as practicable unite with the concrete foundation and prevent slipping or separation between the concrete and the wearing surface.

In all cases the general contour of the surface of the concrete shall be as closely as practicable parallel to and the requisite depth below the surface of the completed pavement in accordance with the grades established and the directions of the City Engineer.

If any portion of the concrete when tested by a template or a straight edge 6 feet in length shall show a surface more than ½ in. above or ½ in. below the grade established by the City Engineer, then the high places in such concrete shall be picked or otherwise brought down to the proper grade and the low places shall be filled to the proper grade with fine concrete.

TEST FOR VOIDS. To determine the voids in the "Coarse aggregate" or "fine aggregate":—Prepare a vessel, the cubical contents of which is exactly 1 cubic foot (1728 cubic inches), being smaller at the top than at the bottom. Fill the vessel with the aggregate thoroughly dried, "coarse" or "fine" as the case may be, which is to be used. Thoroughly shake or jar the vessel containing the aggregate until it is compacted as thoroughly as possible and the vessel is level full. Then ascertain the net weight of the fine aggregate in the vessel, deduct this weight from 166 (the weight of a 1 foot cube of mineral of which the fine aggregate is composed) divide the difference thus obtained by 166. The result is the percentage of voids.

(Example, Fine Aggregate.) Given a "fine aggregate" weighing after compression in the vessel 108 pounds per cubic foot, 166 minus 108 equals 58; divided by 166 equals 35 per cent of voids in fine aggregate, to which add 5 per cent surplus as specified, or 1.75 per cent equals 36.75 per cent, being the per cent of cement required to one part of fine aggregate, giving a proportion of one part cement to 2.72 parts sand.

(Example, Coarse Aggregate.) Given a "coarse aggregate" weighing after compression in the vessel 99 pounds per cubic foot, 166 minus 99 equals 67; divided by 166 equals 40 per cent of voids in coarse aggregate. Add 10 per cent surplus as specified, or 4 per cent equals 44 per cent of fine aggregate required in the coarse aggregate, equals one part mortar to 2.27 parts coarse aggregate. With the fine aggregate and coarse aggregate as above, the proportions of the different ingredients required would be, one part cement, 2.72 parts fine aggregate, and (the volume of cement being lost in filling the voids in the fine aggregate) the proportion of coarse aggregate would be 2.72×2.27 equals 6.1 parts coarse aggregate, or practically one part cement, three parts fine aggregate and 6 parts coarse aggregate.

The advantage of this specification is that if either the fine or the coarse aggregate furnished is of uniform size, the contractor will be required to use enough cement to fill the then large proportion of voids in the fine aggregate and enough mortar to fill the then large percentage of voids in the coarse aggregate. On the other hand, if materials are available which will produce a smaller percentage of voids in either the fine aggregate or the coarse aggregate, the contractor can figure his proposal accordingly and the city get the benefit of the lower cost of construction.

POURED CONCRETE FOUNDATION

A few words on this matter may be of interest. At the outset the writer wishes not to be understood as in any degree commending the system of grouting crushed stone and *rolling it after pouring and while the cement is setting.* On the contrary, he believes that such a system is contrary to the sound, well-established engineering principle that concrete should be undisturbed as soon as possible after adding the water to the cement and should remain so undisturbed until the concrete is thoroughly set, and that the rolling of concrete is very bad practice which, to a greater or less extent, ruins the cement.

In the year 1908, the city of Wilmington, Del., under its efficient Street Commissioner, Frank W. Pierson, began laying concrete foundation for its pavements by:

1st. Spreading on the rolled subsoil 5 inches of crushed stone passing 3 inches and remaining on 1½-inch ring.

2d. Rolling with 7-ton tandem steam roller, which left *a uniformly graded but well-roughened surface to the base.*

3d. Pouring with grout made of one part cement and three parts sand, and sufficient water to provide the creamy consistency necessary for free pouring, the quantity of grout being such as to leave from ¼ inch to ½ inch of the angles of the stone particles protruding above the mortar.

4th. *Leaving the concrete absolutely alone* until the cement is thoroughly set—from one to two weeks, depending on weather conditions.

The result is very gratifying. The surface of the concrete, while having the desirable uniformly surfaced grade, is sufficiently roughened to firmly "grip" into the bituminous surface to follow.

The concrete is *too firm to permit displacement by any wagon which can be driven over the completed pavement, and that is all that is desired.*

A sawed cross-section of concrete shows that while the voids are not *thoroughly* filled, the mortar has extended to the bottom and every stone is firmly held in place by the mortar. When the writer was first consulted about this, before the work had begun, he was skeptical and feared the mortar would not flow sufficiently to the bottom to make a solid concrete, but "the proof of the pudding is in the eating," and the practical successful use, on a large scale, put his skepticism to naught. For a water-tight dam or a bridge abutment, the result could hardly be considered "first-class concrete," but to sustain loads and provide a solid foundation which traffic cannot disturb for any form of street paving wearing surface it is practically as good as anything could be, and is "first-class concrete" for the purpose. Unfortunately, the writer has not access to the costs on the Wilmington work, but that there is some saving in both cement and labor over mixed concrete of the same depth appears to be evident.

The following specification fairly describes the foundation as laid in Wilmington:

FOUNDATION OF POURED CONCRETE

After the sub-grade has been completed, broken stone that will pass through a ring three (3) inches in diameter and be retained on a ring one and one-half (1½) inches in diameter shall be deposited in a uniform layer to a depth of five (5) inches and thoroughly rolled with a *tandem steam roller,* weighing not less than five (5) tons. After the rolling is completed there shall be poured upon the broken stone a sufficient quantity of grout composed of one part Portland cement, three parts sand, and a sufficient quantity of water to make the grout of such consistency that it can be poured into the voids of the stone without rolling. The grout shall be poured to within one-half (½) inch of the top angles of the stone. The laying of the surface or other traffic shall not be permitted on the concrete until the cement has become thoroughly set.

CONCRETE FOUNDATIONS FROM PAVING BLOCKS

Fifty Blocks of Asphalt Pavement being Relaid in One Contract—Present Foundation of Stone Blocks Broken Up for Concrete—Binder and Top Surface Laid at One Operation—Itemized Cost

When the repairs to an asphalt pavement cost over 60 cents per square yard in a single year it is time to look into the cause and take radical measures for a remedy. Even macadam, the least durable of all kinds of pavements, could scarcely cost more. This was the situation regarding the maintenance of the asphalt pavement on Central Park West, the portion of Eighth avenue between Fifty-ninth street and 110th street, an area of 46,458 square yards, in Manhattan Borough, New York City, during the past year. The street has been maintained by the city under a temporary arrangement by which it paid $1.48 per square yard for work actually done, the patches being guaranteed for one year. How the city came to be responsible for this maintenance is an interesting story. The pavement was laid and finished in July, 1898, by the Atlantic Alcatraz Company for the price of $3.20 per square yard, under a maintenance guarantee of 15 years. Of this price they received 70 per cent, or $2.24 per square yard, on the completion of the work. The remaining 30 per cent was to be in ten equal annual payments extending from the 6th to the 15th year of the guarantee. The pavement was of California asphalt, whether of the original 2× brand (a natural asphalt), or an oil product, the D grade, is unknown, but probably the latter. At any rate the pavement appeared to be good and stood well during the first few years. About five years ago the company went out of business and the guarantee was assumed under some arrangement by the Barber Asphalt Paving Company. The repairs became excessive, and even with the profit on repair work, paid for by private parties at the rate of $3.20 per square yard, the guarantee became a losing proposition. The Barber company abandoned the guarantee contract, refused to do any more and turned the matter over to their legal department. The city has now spent all of the retained money and looks to the original bondsmen for compensation for future repairs.

Whether the city will be able to recover the money it will spend during the balance of the term of the guarantee is a question. There is no doubt, however, that the character of traffic on this street has changed since it was paved. At that time five-ton loads were such curiosities that people stopped to look at them, and three-horse hitches were first coming into general use. Now five-ton loads are as common as baby carriages and much heavier loads are frequently hauled. The rebuilding of the city with skyscrapers has created an entirely new class of traffic—that of iron girders weighing ten tons and more, hauled on heavy trucks. A girder weighing 78 tons was recently hauled over some of the city pavements by 56 horses.

This heavy traffic has brought to bear upon the base of the pavement a new stress which, in the opinion of engineers and others, it is not able to carry. When asphalt pavements were first introduced into New York there were many miles of old stone pavements which had been laid with deep gutters—eight inches and over. To save the cost of constructing a foundation, minimize the tearing up of the street and simplify the work it was proposed that the old surface be brought to a uniform grade with binder and this be covered with two inches of asphalt surface mixture, which it was believed would result in a satisfactory pavement. And for a few years the result seemed to justify the innovation.

After a time all of the old streets having deep gutters had been resurfaced and the question arose as to what to do with the stone streets with six-inch gutters, since these would be raised too high if surfaced in their existing shape. Mr. E. P. North, then the official in charge of streets, decided to take up and relay all the stone blocks at a lower grade to serve as foundation. This produced a new and distinctly weaker class of work. The stone blocks were not bedded as firmly as if left in their original condition and the layer of binder was made thinner than before, giving the surface less protection from the stress of traffic on the irregular foundation beneath. Some pavements were laid with binder so thin that when drying up after a rain the joints between the blocks could be traced distinctly by the lines of moisture in the pavement.

One of the least successful of these pavements in the city was First avenue. As the result of investigations made there it was believed that the weakness of the block foundation was responsible for the failure of this class of pavement to stand traffic and it was decided to entirely abandon the use of stone block foundations and thereafter to use nothing but Portland cement concrete.

This was the kind of pavement laid in Central Park West. The high cost of repairs, taken in connection with the low prevailing prices for new work, led the city engineers to decide to repave that street throughout on a concrete foundation. Accordingly the work was advertised and the contract awarded to the low bidder, the Barber Asphalt Paving Company, at its figure of $1.17 per square yard for surface and binder, and $5.25 for concrete foundation in place, including necessary excavation; the company to have the old blocks and receive the prevailing price for curbing and a few small items. The blocks given to the contractor were considered of little value because so much stone block pavement is being removed, and there is so little demand for the blocks that they scarcely have even a nominal value, and anyone who wants them can have them for the trouble of picking them up and hauling them away.

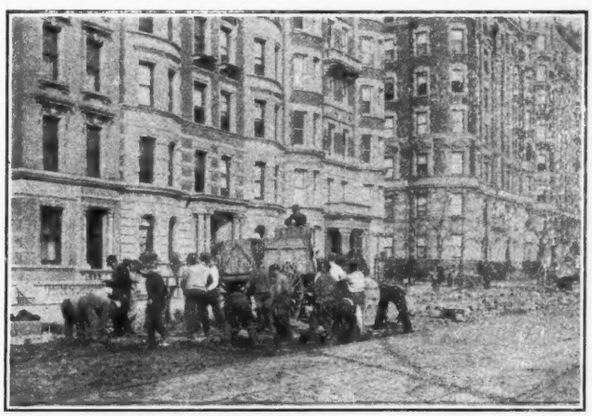
Although work on the street did not start until the middle of October, the contractor intends to finish the work before winter sets in. To accomplish this he is using about two hundred and fifty men and seven large pieces of machinery in addition to an asphalt plant, the machinery comprising two stone crushing outfits, two concrete mixers and three steam rollers.

TEARING UP OLD ASPHALT

The first part of the work consists in taking up and removing the old asphalt pavement. This is pried up with crowbars, broken with sledge-hammers, thrown into wagons and taken to the dump. The irregular surface of the stone block foundation prevents the use of a plow, as the danger from accident is too great to justify the possible saving in expense. Next the blocks are loosened by men working in gangs, who, with long bars, loosen one or two rows at a time, removing, say, every fifth row to give space for the succeeding rows when loosened. The blocks may be left in place for some time, and carts can be hauled over them without difficulty. The blocks are next

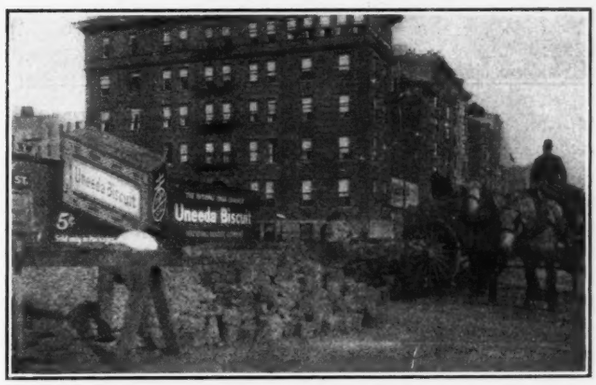
PRYING UP OLD BLOCK FOUNDATION

loaded by hand into wagons, which enter generally from the dirt grade and haul out over the loosened blocks. The stones are taken either to a portion of the street from which the old asphalt has not been removed where they are broken by hand by men working by piece work, or to a crushing plant which was temporarily located at Eleventh avenue and Sixty-fourth street, and was afterward removed further up the line as the work progressed from Fifty-ninth street north to 110th street.



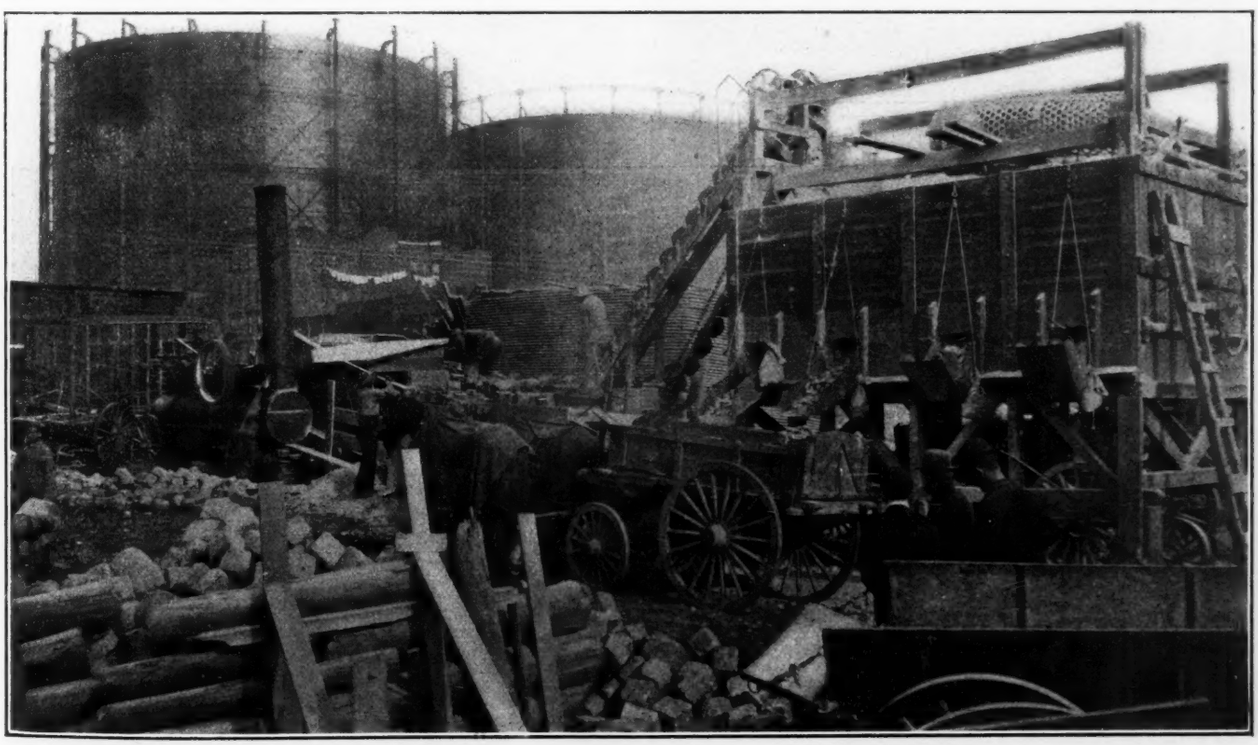
LOADING OLD BLOCKS FROM FOUNDATION

This plant is an extremely inexpensive affair as far as the cost of erection is concerned. The crushers are Champions, mounted on the usual portable frames and wagon beds. One of these is operated by a Buffalo-Pitts steam roller and represents about the limit so far as portability is concerned. A rough wooden framework is erected at one side of the crusher to receive blocks from the wagons and serve as a platform for the men feeding the crusher. The other crusher is erected more substantially and is operated by an Erie portable boiler and engine. The crusher stands on the I-beams which ordinarily rest on the wagon body of the outfit and is placed at a higher elevation than if resting on the wagon body. The platform about this crusher is larger than in the other outfit, and there is a screen and stone bin with compartments for different sizes of stone. The wagons which bring stone to the crushers return with loads of crushed stone.



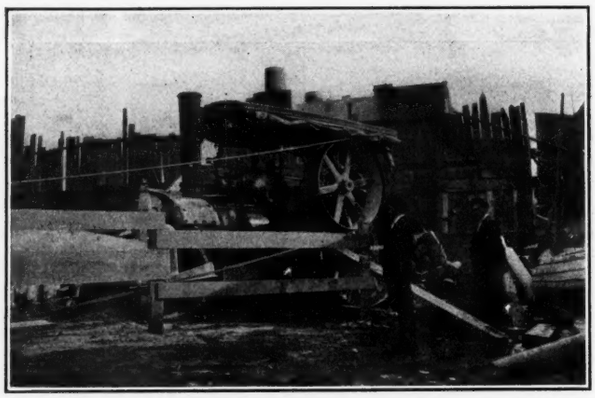
BREAKING STONE BY HAND

After the blocks are removed a small amount of trimming up of the subgrade is necessary, there being on the average a slight surplus of dirt to be removed. After rolling, the grade is ready to receive the concrete foundation. The concrete is being mixed with two Iroquois concrete mixing machines working at points several blocks apart. The Iroquois mixer is of the pug mill type, with a single shaft. Power is supplied by an



TEMPORARY STONE CRUSHING PLANT IN NEW YORK CITY

PORTABLE STONE CRUSHER



OPERATED BY STEAM ROLLER

upright boiler and an engine protected from dust by a sheet-iron casing. There is a feeding hopper with worms which feed the sand, stone and cement into the mixing trough in the specified proportion of 1:3:6. Sand and cement are fed into one side of the mixer and stone into the other. The sand and stone are shovelled in directly from the grade by men and the cement is emptied into the hopper from bags brought from piles placed along the curbing. The mixer is placed in the center of the 30-foot strip being paved and propels itself forward by its own power. It is located at a distance of 15 or 20 feet from the face of the work. Water is fed in by direct connection through rubber hose from nearby hydrants. The concrete is delivered directly into iron wheelbarrows held under the discharge chute, in which it is wheeled to the face

LAYING BINDER AND SURFACE TOGETHER

GRADING CONCRETE WITH RAKES

of the work and dumped pretty well back so that it is necessary for men with rakes grading it to pull the stones forward. Men with iron tampers bring the concrete to a uniform surface and another with a broom slushes it over with mortar so that there are no loose stones left in the surface, but all are firmly cemented into the six-inch bed. As is customary now in about all classes of concrete work, considerable water is used in the mixture, and the individual stones are consequently packed closer together than occurs if a dry mixture were used. Iron pegs are used in staking out the grade for the men to work to.

After the concrete has set sufficiently, the binder and surface are laid in such a way as to make them form practically one layer. This method is possible only where a large plant is available. The binder is 1½ inches thick and the surface the

MIXING CONCRETE WITH CONTINUOUS MIXER FOR PAVEMENT FOUNDATION

same. Both are laid at the same time, the gangs working under direction of a single foreman and at a distance apart ranging from about 70 to 100 feet. The binder used is of better quality than that laid when the street was originally paved, considerable dust being retained in the binder stone. This requires the use of a larger percentage of asphalt and results in a much stronger binder. The specifications call for a cement composed of asphalt having not more than 10 per cent of matter in it other than bitumen, so this presumably is Bermudez. There are no original or striking features about the laying of the binder and surface except that they are, as stated, laid at practically one operation and are well rolled, three steam rollers being engaged on the work.

In figuring the cost of this work it must be borne in mind that the price paid for concrete covers the cost of removing the old pavement and excavation of all kinds—a class of work best figured by the square yard. As the stone blocks are 7 inches deep and the concrete base 6 inches there is a surplus of blocks; but as these are almost worthless, the surplus will not be figured as a source of profit, although it is so if the blocks are given away on the street or if the surplus of crushed stone is used for other purposes. Possibly the saving might amount to from one to three cents per square yard on the whole job.

Prying up the old asphalt pavement and loading on wagons is done for about 3 cents per square yard. It is assumed that the old pavement weighs 200 pounds to the square yard and that a team hauls 7,000 pounds. Teams are paid $7 per day and, like the men, work eight hours, and should make five loads a day on the average. The old pavement is hauled to scows at Seventy-ninth or Ninety-sixth streets. The charge made for the privilege of dumping on the scow is 60 cents per load. Hence the cost is $2 per load of 35 square yards, or 5.7 cents per square yard plus 3 cents for labor equals 8.7 cents.

Loosening up the old blocks and putting them on wagons to haul to the crusher costs about 6 cents per square yard, on the basis of the blocks weighing 700 pounds per square yard and a laborer loading 12 tons per day, 2 cents being allowed for the loosening only.

The trimming up of the grade is an uncertain item, as in places there is little or no dirt to be carried away and in others there is 2 inches. The old pavement was 10 inches deep, 7 inches of blocks and 3 of binder and surface; the new pavement is 9 inches deep, 6 inches concrete, 1½ binder and 1½ surface. The labor of trimming may be taken at 3 cents, rolling, where rollers are at hand all the time, 1 cent. Perhaps one load of dirt would have to be moved for every 200 square yards of pavement, although in the grading work shown in the illustration it must have averaged one load in 50 square yards. At $2 a load for hauling and dumping dirt the hauling would cost 1 cent per square yard, making the fine grading 5 cents per square yard.

In figuring the cost of stone it is best to figure on the cubic-yard basis. One cubic yard of stone (the blocks are granite) is assumed to weigh one and one-third tons. Some of the stone, as stated, is broken by hand at a cost of $1 per cubic yard plus the hauling. Probably nine-tenths, however, goes to the crushers. The teams haul both ways, making seven loads a day, either with blocks or crushed stone. Then hauling blocks to the crusher costs 20 cents a ton, or 27 cents per cubic yard, and the return haul is the same. If the stone came to the crusher regularly it might be run through for a labor charge of a little over 10 cents; but as much stone has to be unloaded on the ground, piled up and wheeled to the crusher, the average cost of such work generally runs 25 cents per cubic yard, or, if there is much sledging to do, even higher. Probably 10 cents will cover fuel and cost of plant. The stone, therefore, costs at the mixer, on this basis, 89, or, say, 90 cents per cubic yard, about the price that would have to be paid for new stone along side of the docks. To this we must add the cost of excavation, 8.7 cents per square yard for removing old paving, 6 cents for loosening and loading blocks and 5 cents for the fine grading, making 19.7 cents, times 6 to get the equivalent in cubic yards, giving $1.18 to add to the cost of the concrete.

The cost of the concrete is then: $1.18 for excavation, 90 cents for stone, one barrel Saylor's Portland cement about $1.80, 4/10 cubic yard of sand at $1, 40 cents; labor, mixing and laying, 48 cents, and 12 cents for expenses incidental to the use of machinery—a total of $4.88; leaving a profit of 37 cents per cubic yard on that part of the work.

The cost of laying binder and asphalt surface has been studied by the engineers of the Highway Department, who have at their disposal the itemized cost of operating a municipal asphalt plant. They figure that 80 cents per square yard is the lowest cost of laying this portion of the work. This is based on asphalt at $25 per ton, but does not allow for general plant charges, interest, rent, depreciation and fixed charges. No allowance has been made for general office expenses and cost of maintaining the organization of the contractor during the winter months when many foremen and skilled workers are idle and under pay. This item probably amounts to nearly 10 cents per square yard. This leaves a margin of 27 cents per square yard for guarantee and profit plus the estimated profit on concrete amounting to 6 cents per superficial yard. Viewed in the light of the city's experience in cost of repairing the street during the past year, it would seem that if the slightest error or bad judgment were made in making the asphalt mixture for the street, or any large portion of it, the apparent profit would soon be used up in cost of repairs.

CEMENT IN SEWERAGE STRUCTURES

By R. E. McDONNELL

A GROWING and extended application of cement as a building material has resulted in its use, both in season and out of season, and most of the larger cities in our country have begun to reap the results of the unwise and unwarranted use of cement for certain classes of construction work.

In European countries, where the use of cement is older, a more intelligent application of it has resulted, and in our public works, the officials and engineers in charge could well profit by their experience and avoid wasting thousands of dollars. So destructive to concrete sewers and concrete sewage purification works has been the wastes from distilleries, breweries, dye works, and many other factories using acids, that special legislation has been enacted in most of the German cities, requiring the owners of these industries to dispose of and treat independently their refuse, thus preventing these destructive acids entering and destroying sewers that had cost millions of dollars to construct.

In many of the German cities where manufacturing is the chief industry the hardship of separate treating plants for their refuse has caused serious trouble and a loss of many large industries is threatened. In many of the towns in England, the acid-destroying agencies and the difficulty in handling such effluent at the sewage purification works has resulted in imposing an additional tax upon certain industries for the use of the sewers. A special tax of this kind is now being advocated by the officials in charge of the Sewerage Department of the city of Glasgow, Scotland. The General Manager of this department in a public address spoke as follows:

There is another class of liquid trades refuse which finds its way into the sewers unregulated and uncontrolled. This comes from tanneries, breweries, dye works, chemical works, etc., all of which become mixed up with the ordinary city sewage, making the latter very much more difficult to deal with when it arrives at the works.

The question might have been asked—Should the liquid trades refuse from public works be allowed to pass into the sewers without first being subjected to a process of treatment by the producers so that it may be more efficiently and economically dealt with at the sewage purification works?

Personally, I think it would be wrong for the corporation to hamper industry, but surely it is quite reasonable that producers who are working for profit should pay a differential rate to the corporation for the treatment of their liquid trades refuse, which in many cases is twenty times worse to deal with than ordinary domestic sewage. This differential rate is charged in some towns in England, according to the quantity and quality of the discharge, and I fail to see why the same should not be done in Glasgow, thus relieving the ratepayers from the cost of purifying the liquid trades refuse.

Aside from the use of cement in sewers the question from a sanitary standpoint should be seriously considered.

The American tourist in Europe cannot help being favorably impressed with the many convenient public lavatories or comfort stations throughout every city in Europe, but if he observed these closely, it was especially noticeable from a sanitary standpoint between the ones lined with enamel brick and those having a plain cement interior; the enamel brick ones being clean, perfectly sanitary and free from any odors, while the cement-lined ones were kept clean with difficulty, and were never free from objectionable odors.

Every sanitary engineer having experience in the use of vitrified pipe sewers realizes that the present cement joint has been their most unsatisfactory feature. Tests of the soil surrounding broken joints have shown the ground to be saturated with germs from these leaky joints, and the use of other material for these joints in the European cities is already being followed by American engineers.

If an engineer is true to his profession, he will profit by the mistakes of others and, in representing municipalities, will carefully consider durability and permanency of construction in the selection of building material suitable for conditions under which it is to be used.

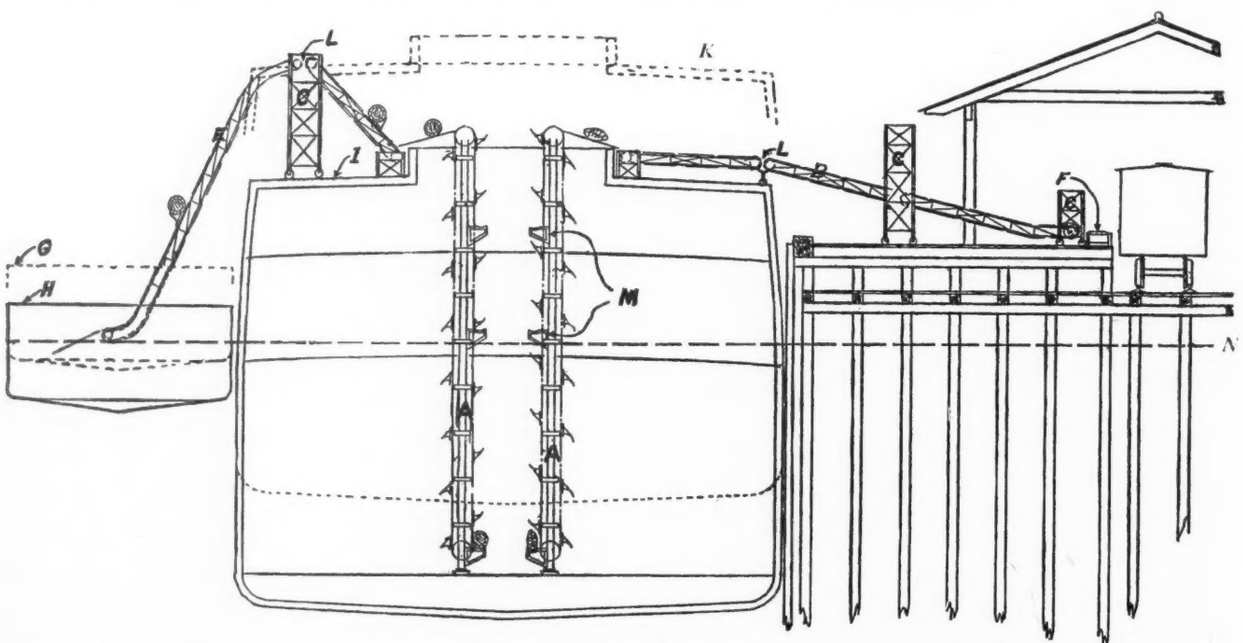
CEMENT UNLOADING PLANT

To Handle Six Thousand Bags or Barrels an Hour—Adjustable to Varying Depths of Ship—To Be Installed on the Panama Canal Wharves

IN order to facilitate the unloading of cement at the piers at Cristobal a contract has recently been let by the Panama Railroad Company to the Alvey-Ferguson Company, of Louisville, Ky., for a system of cement conveyors. The contract was signed on August 25, 1909, and delivery of the first complete conveyor unit, for cement barrels, was to be made at New York within sixty days from that date, and two complete units for either barrels or bags are to be delivered at intervals of thirty days thereafter until all the units are delivered. Thirty days are allowed the contractor for the installation of each complete unit after the material reaches the Isthmus. There will be six conveyor units, two for cement in bags and four for cement in barrels, and each unit is to have a maximum capacity of 1,000 bags or barrels per hour. The price of the complete system of conveyors is $29,760, and the contractor agrees to furnish any additional units, that may be required within one year, at a specified price.

Over 4,000,000 barrels, or over 800,000 tons of cement, of the amount contracted for by the Isthmian Canal Commission in June, 1908, are yet to be brought to the Isthmus for use in the construction of the locks of the Canal, and for other purposes, most of which will be carried in the steamships *Ancon* and *Cristobal*. Each vessel makes one round trip a month between New York and Cristobal, and each has a maximum capacity of approximately 10,000 tons of cargo, usually about equally divided between cement and general freight. As the *Ancon* and *Cristobal* are twin ships, each vessel has the same arrangement of hatches, all of which have a clear opening of 17 feet 4 inches by 20 feet, except hatch No. 4, which has an opening of 19 feet 6 inches by 20 feet. It is the intention to have one unloading conveyor unit in each of six hatches and the vessel will be so loaded that the conveyor in the forward hatch, No. 1, can be used exclusively for cement in bags; those in hatches Nos. 2 and 3 for cement in barrels, that in No. 4 for bags, and those in Nos. 8 and 9 for barrels. The cement in bags will be conveyed to the pier for loading into freight cars for transportation by railroad to the locks at Pedro Miguel and Miraflores, or to any other point where it may be needed, and the cement in barrels will be conveyed to barges alongside the ships for transportation by water to Gatun.

The accompanying diagram shows the arrangement of a conveyor unit for bags and one for barrels. The unit for bags is composed of three parts: (1) a vertical elevator for raising the bags of cement from the hold to the deck of the ship, consisting of a vertical shaft on which revolves an endless chain of brackets; (2) a portable apron conveyor at right angles to the ship, built in sections 20 feet long, which conveys the bags from the deck of the ship to the pier, and which has two towers for adjusting the aprons as the vessel lightens and rises in being unloaded, there being a difference of 12 feet between loaded and empty draughts; (3) a stationary apron conveyor, built lengthwise on the pier, which delivers the bags to any point along the railroad track.



A. Vertical elevator.
B. Portable apron conveyor.
C. Adjusting tower.
E. Barrel lowerer.
F. Stationary apron conveyor.
G. Barge empty.
H. Barge loaded.
I. Ship loaded.
K. Ship empty.
L. Universal joint and coupling.
M. Loading stationary brackets.
N. Surface of water.

SKETCH OF CEMENT UNLOADING PLANT

The conveyor unit for barrels is composed of two parts: (1) a vertical elevator, the same as in the unit for bags; (2) a barrel lowerer, with an adjusting tower, which conveys the barrel of cement from the deck of the ship into the hold of the barge alongside. Hand labor will be required at three points only with the conveyor system, viz., in placing the bags, or barrels of cement in position on stationary brackets, located on each of the three decks of the hold, so that the brackets on the vertical elevator can raise them; on the pier, in transferring the bags from the stationary conveyor to the freight cars, and in the hold of the barge, in removing the barrels from the lowerer and stowing them away.

Each vertical elevator in the conveyor system will be operated by a 10-h.p. electric motor, each barrel lowerer by a 5-h.p. motor, each complete portable apron conveyor by a 3-h.p. motor, and each section of the stationary apron conveyor on the pier by a 7½-h.p. motor, making a total of 20½-h.p. for each bag conveyor unit, and 15-h.p. for each barrel conveyor unit. All motors will be totally enclosed and will be dust and moisture proof. Electricity for the motors will be supplied from the power house of the Gatun handling plant.

It is expected that one complete unit of the conveyor system will be in operation by December 1, and that at least two units a month will be completed and in operation thereafter until the entire system is installed. Any part of the conveyor system which may prove defective in workmanship, material, or design, within one year will be replaced by the contractor without cost to the railroad company.—*Canal Record.*

GENERAL VIEW OF SINTON PLAYGROUND, SHOWING CONCRETE SHELTER STATION

REINFORCED CONCRETE SHELTER HOUSE

Just Completed in a Cincinnati Public Park—Contains Baths and Conveniences—History of Park Development in That City

REINFORCED concrete has recently been used by the Park Commissioners of Cincinnati, O., for a shelter house in the Sinton playground, and the structure is now practically completed. Park Superintendent J. H. Rodgers expresses himself as more than satisfied with the result of adopting this material, as do the Park Commissioners also. "Band stands, shelter house and other park buildings," said Mr. Rodgers, "must be left alone during the winter to a great extent. For this reason they should be constructed of fireproof materials to guard against incendiary or accidental fires. Reinforced concrete appeals strongly to me for this reason and for its stability as well. Besides these features is the sanitary nature of the material as well as the fact, illustrated by the present building, that the material is susceptible to artistic architectural treatment and ornamentation, ideal for park purposes."

In this shelter house are baths for the children, comfort stations, etc., on the first floor, which is level with the western or lower playground; while on the second floor, level with the eastern or upper playground, are two circular shelter houses, one for boys and one for girls, with a broad-roofed space between. The reinforced concrete work on this building was done by the Ferro-Concrete Construction Company, of Cincinnati, Chicago, Kansas City and Seattle.

This is Cincinnati's first reinforced concrete building, but it seems probable that it will be followed by others. The history of the agitation, of which this park and shelter house are a first material result, is interesting. Although the eleventh of American cities in point of population, Cincinnati ranks fortieth in extent of park area. A recent awakening of the park idea resulted in the preparation of an elaborate park and boulevard plan by Park Engineer Kessler, of Kansas City, which was followed by the passage of a law by the Legislature empowering the Mayor to appoint a Park Commission. Acting upon the authority thus given him, the Mayor appointed as members of this Commission Messrs. Julius Fleischmann, L. A. Ault and Wm. Gilbert, three public-spirited business men, who have devoted much time and interest to the work of the commission. Within a few months this commission will lay before the people a proposition to bond the city for between one and two million dollars for park improvement.

When it was appointed, the commission received charge of existing park property, consisting of isolated tracts and parks which had previously been under control of the Board of Public Service. Among these was the Sinton playground, which lies in the heart of the most congested part of the city, where are found the homes of the most humble immigrants and of the colored population. Children abound here, and there have been several fatal accidents, in which they were run down by street cars and trucks, and these accidents did much toward deciding Council to tear out an entire block of old houses and convert the space into a breathing spot and playground for the children. The last loads of debris were being carted away from this plot when the new commission came into office, and one of its first acts was to ask for an appropriation of $25,000 for the completion of the playground. While the matter was being discussed in Council, Mrs. Chas. P. Taft, wife of the President's brother, offered a donation of $10,000 to be applied upon the erection of a suitable shelter house. The commission and Council accepted this donation and named the park after the late David Sinton, the father of Mrs. Taft. This sum and the $25,000 for which bonds were issued was used in the construction of the playground, which included the erection of the shelter above described and its equipment, the purchase of apparatus and the construction of a low concrete wall around the playground, cement walks and reinforced concrete lamp posts.

CONCRETE BLOCKED PAVEMENT

Laid in Knoxville by the Knoxville Railway & Light Company—Method of Construction—Machinery and Tools Used

BY W. E. PUTNAM

DURING the past four or five years the Knoxville Railway & Light Company, of Knoxville, Tenn., has spent large sums of money in reconstructing its tracks and extending its lines throughout the city and suburbs. Much of this reconstruction and extension has been necessitated by the very rapid growth of the city, the extensions for the most part having been made in the many thriving suburbs which are found on all sides. There has been, however, a great amount of reconstruction carried on, due to the activity of the city in street paving during the past four years.

On January 1, 1908, there were in Knoxville about 7.7 miles of paved streets, divided approximately as follows: 2.9 miles of vitrified brick, 4.0 miles asphalt and 0.8 mile of bitulithic pavement. The paving in the street car tracks in all cases was vitrified brick, there being about 8.5 miles of this, figured as single track paving, or about 36,000 square yards. Since January 1, 1908, and including all pavement under contract for 1909, there have been laid by the city 14.1 miles of paved streets, divided as follows: 1.1 miles of vitrified brick, 8.7 miles of asphalt, 1.1 miles of bitulithic, 3.0 miles of concrete blocked pavement and 0.2 mile of tar macadam. The street railway company has laid during that time 2.1 miles of vitrified brick and 2.7 miles of concrete blocked pavement.

On most of the streets paved, the railway company has used in its track construction either a 7-inch tee rail weighing 80 pounds per yard, a low tee rail of 70-pound A. S. C. E. section, or a low tee rail of 55-pound or 60-pound weight. To provide the necessary groove for the car wheels, a brick of special design has been used, these bricks being placed in half and full lengths, alternately, to break joints. Owing to the fact that the paving bricks are about the same depth as the low tee rail, thereby leaving no concrete foundation on top of the ties and under the brick, and as it was found to be very difficult to get a special brick for grooves or a regular brick which would give satisfactory service the railway company laid in 1908 about 2,800 square yards of concrete blocked pavement, the work being done by the R. S. Blome Company, of Chicago, under specifications prepared by Messrs. Ford, Bacon and Davis, of New York, engineers for the Knoxville Railway & Light Company. These specifications were, with the exception of a few minor details, drawn in accordance with those of the Blome Company for its "Granitoid Blocked Pavement." The work done in 1908 was on streets where the Blome Company were paving the balance of the street with this pavement, and where the street railway company had a 70-pound A. S. C. E. rail. The general specifications under which this pavement was laid were as follows:

(1) Foundation for pavement prepared by the railway company.

(2) Concrete base, 5¼ inches thick, composed of one part

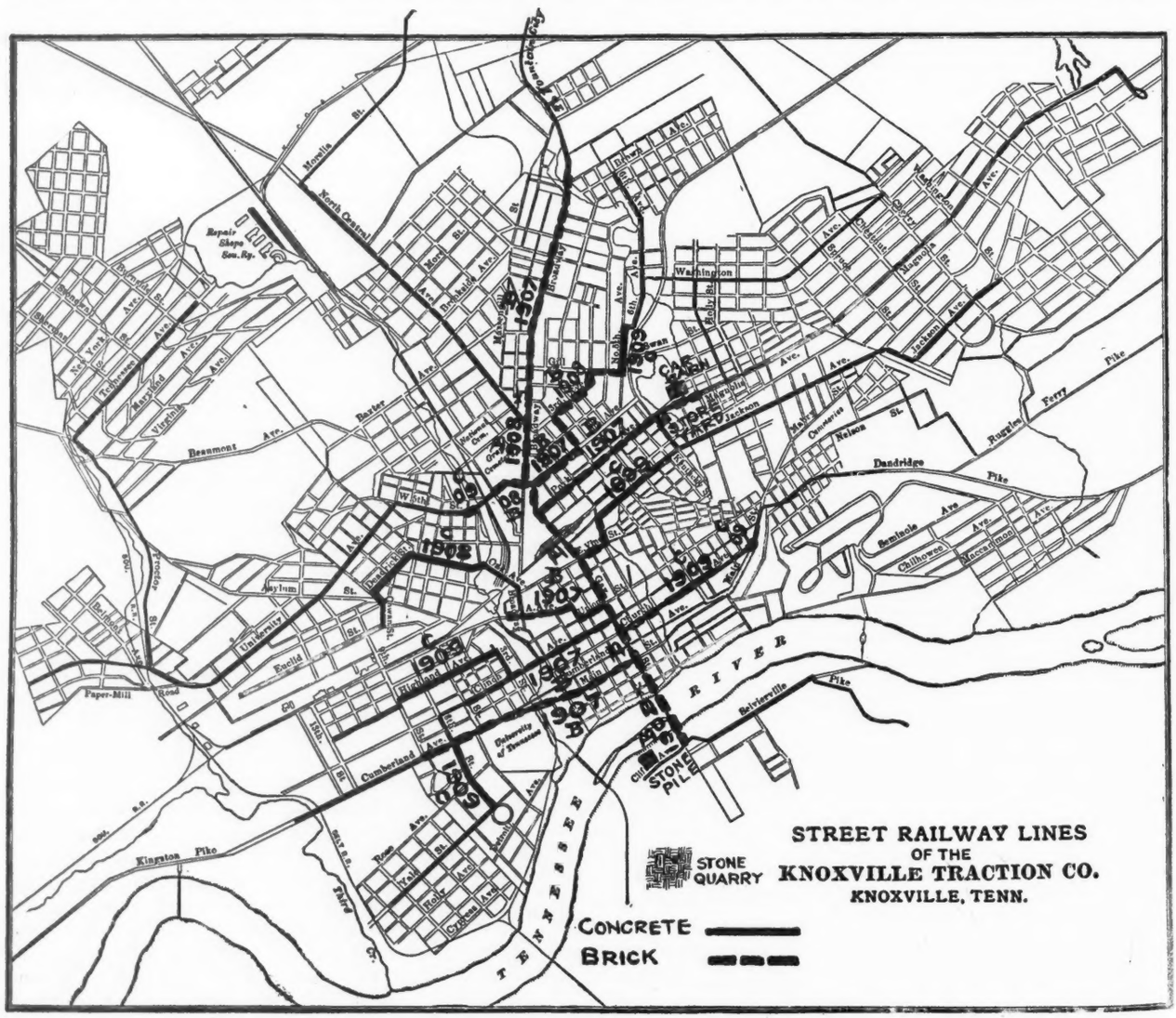


FIG. 1. MAP SHOWING EXTENT OF TRACK PAVING IN KNOXVILLE, WITH DATES OF INSTALLATION

Portland cement, three parts Tennessee River sand, and four parts broken limestone, reasonably free from dust. This base placed in one layer and sufficiently wet to show excess of water with reasonable tamping. Surface of base parallel to finished surface of pavement.

(3) Top surface, 1¾ inches thick, composed of one part Portland cement and one and one-half parts crushed granite (50% ¼-inch, 30% ⅛-inch, and 20% 1-16-inch sizes). To be placed while the base is green, spread and finished by special tools, and the surface marked into blocks 4½ inches x 9⅜ inches, the grooves being ½ inch deep and ½ inch wide at surface. Pavement to have a crown of ½ inch between rails.

(4) Removable blocks to be placed at rail joints resting on sand cushion, ½ inch thick. These blocks made from top surface material and 8½ inches x 11½ inches in size, there being six blocks at each joint. Joints approximately 33 feet apart. Space around blocks to be filled with approved brand of asphalt filler.

(5) Expansion joints, ¾ inch wide, and extending across track, 100 feet apart, to be filled with approved brand of asphalt filler.

(6) Operation of cars for about two-fifths of the work was maintained over the track while pavement was being laid. Over balance of work, the cars were kept off the track until newly laid pavement had set for 48 hours.

Work in 1909

With the exception of one short section, the city's portions of all streets where the railway company had tracks to be paved this year are being paved with either asphalt or brick. On all but three streets to be paved by the company, the track was either 55-pound or 70-pound tee in good condition, requiring only about one-third new creosote ties, retamping, relining and surfacing of track, and an occasional change of grade. It was, therefore, decided to pave all sections this year with concrete blocked pavement and bids were submitted by the R. S. Blome Company for doing the work. The price named being higher than the railway company's estimated cost of the work, the pavement was laid by the company's forces. With but few exceptions the general specifications of the Blome Company were followed, and the work was put in under its general approval, but the company reserved the privilege of using its own judgment in all matters pertaining to management of work and to make such changes in design as were thought advisable. The pavement being laid this year is much scattered over the city, as is shown by the map in Figure 1. The location of car barns, store yard, stone pile and quarry is also shown by this map.

Before giving a description of the method of installation, it will be best to describe the pavement itself, which can be done by giving the following specifications, which are somewhat different than the ones used in 1908.

(1) Foundation of pavement prepared by the track forces of the company, the surface being parallel and 7 inches below the finished surface of the pavement, except that in the case of 7-inch tee-rail construction, there was left a space under the rail to allow concrete to entirely surround the rail.

(2) Concrete base, 5¼ inches thick, composed of one part Portland cement, two and one-half parts Tennessee River sand and five parts of broken limestone (white marble) not exceeding 1½ inches in size and reasonably free from dust. To be placed in one layer and sufficiently wet to show excess of water at surface with reasonable tamping. The surface to be parallel to surface of finished pavement. Space along inside of rail to be left to allow top surface material to be placed as described under (3).

(3) Top surface, 1¾ inches thick, composed of one part Portland cement and one and one-half parts crushed granite (50% in ¼-inch, 30% in ⅛-inch, and 20% in 1-16-inch sizes). This mixture to be made by hand, spread and finished by special tools, the surface being thoroughly floated, trowelled and marked into blocks 4½ inches x 11¼ inches, the grooves being ½-inch deep and wide. Pavement to have a crown of ½ inch above level of rails and to conform in all cases to the finished grade of the street, the grade of the track being approximately level with the curbs. The pavement to be given a rough surface by passing suitable brushes over it when properly marked, both parallel and at right angles to the line of track. The grooves for car wheels to be made with a special tool giving a depth below top of rail of 1¼ inches, and width of 3½ inches at surface, this tool to be passed over the work a second time after the pavement is marked into blocks, to insure proper dimensions of groove. Especial care to be taken that the pavement at the rail is in no case above the level of the rail. All exposed edges to be rounded by edging tool. Full thickness of top surface to be provided in wheel grooves.

(4) Expansion joints, ¾ inch wide, to be placed 100 feet apart, at right angles to the track, the opening to extend to the bottom of the concrete base and the space to be filled with asphalt filler of an approved brand, tested to a temperature of about three hundred degrees Fahrenheit. This filler not to be placed until the wetting of the pavement after installation has been stopped.

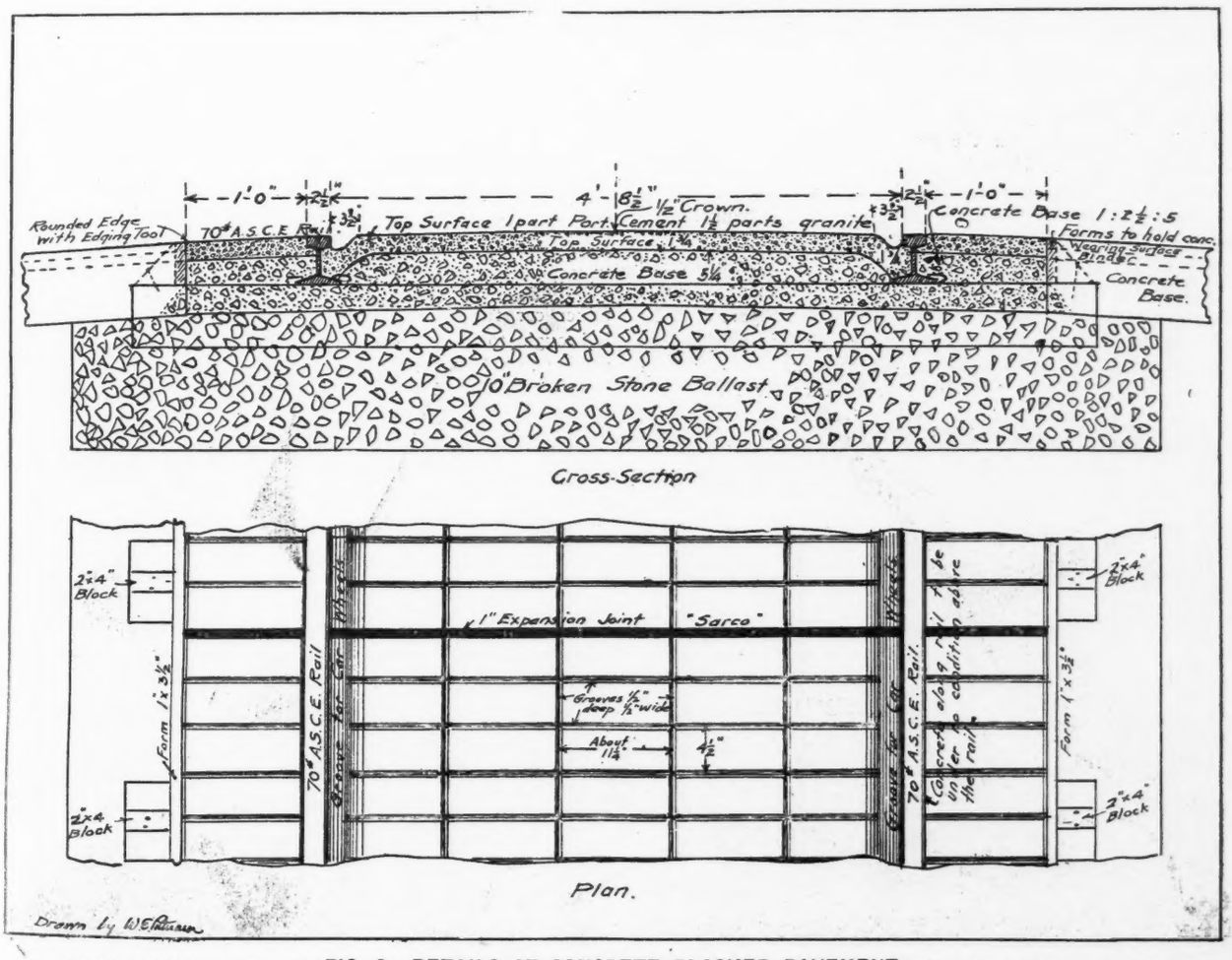


FIG. 2. DETAILS OF CONCRETE BLOCKED PAVEMENT

(5) Operation of cars not allowed over the track until the pavement has been in place for seventy-two hours.
(6) Pavement to be thoroughly wet two or three times a day for four consecutive days after being laid. In the fall, when the temperature is lower, this time may be reduced to two days.
(7) Team traffic to be kept off the pavement until the expansion joint material has been placed, after which time teams to use the paved strip only occasionally until the adjoining portion of street is paved.
(8) Cement and sand are to pass standard tests adopted by the American Society of Testing Materials, except that the strength tests of sand briquettes are to be accepted if passing 150 pounds per square inch with one and three mixture at seven days.

Details of pavement are shown in Figure 2. The method of constructing the pavement is as follows:

Method of Installation of Pavement

As soon as the track has been put in readiness for the paving the forms are placed alongside the track, 12 inches from the back of the rail, the top of the form being set for the top of the finished pavement and from ¼ to ½ inch below top of rail, depending on the elevation of the curbs on either side of street. These forms are held in place by blocks nailed to the ties. No forms are required on double-track pavement, as the concrete extends to the outer rail only.

Broken stone is hauled in side dump stone cars (shown in

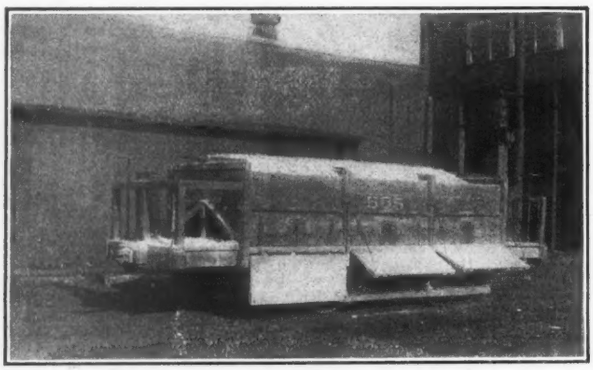


FIG. 3.—SIDE-DUMP STONE CAR

Figure 3) holding 9 cubic yards each and provided with swinging doors to throw the stone into timber boxes placed alongside the track. These boxes are 4 feet wide and 10 inches deep and are made in sections 12 feet long with one end made to receive the end of the adjoining box. Sand is hauled from the store yard on flat trailer cars, as shown in Figure 4, holding six cubic yards each. The first load each day is delivered attached to the motor car pushing the mixer. Cement is hauled from the store yard on motor cars, as shown in Figure 4, or by team, whichever proves most convenient as it is needed, 150 sacks being hauled as a car load and 32 sacks by each team. Granite is hauled either by teams or by cars from the store

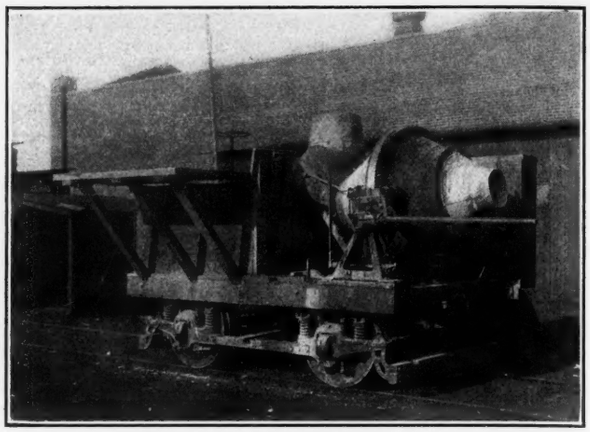


FIG. 5.—CONCRETE MIXER (SMITH) MOUNTED ON FLAT CAR

yard, where it is delivered in car-load lots, the quantity in railroad cars ranging from 15 to 50 tons, the granite weighing approximately 1¼ tons per cubic yard. The granite is distributed in boxes alongside the track to keep it clean and to prevent waste. Boxes originally made for holding sand were later used for granite when the sand was delivered by trailer cars.

Concrete for the base is mixed by a No. 1 Smith mixer, 1906 model, mounted on the rear of a small flat car. Current is furnished from the trolley through a 10-h.p. Crocker-Wheeler 500-volt motor, the rheostat being a Cutler-Hammer for a machine requiring a duty of 17.5 amperes, ohms tested 24. Fuses used are 30-ampere, 600-volt Noark, manufactured by H. W. Johns-Manville Co., although some 40-ampere fuses also were used. The motor shaft has a 6-inch pulley and the mixer shaft a 44-inch pulley. The mixer makes about 14 revolutions per minute under load. The loading platform of the mixer car acts as a cover for the motor equipment and is about 3 feet above the floor of the car. The mixer car is coupled to the motor car, and runways for wheeling sand and stone connect from motor car to mixer car. Stone is loaded into wheelbarrows set on one side of the motor car and shovelled from the timber boxes beside the track. Sand is loaded direct from the trailer into barrows. Cement is stacked on the motor car in the center of the floor to allow runways on either side for wheeling sand and stone. A shelf is also provided on the mixer car for holding about fifty sacks of cement. Water is brought to a barrel on the mixer car platform by hose connection to a ¾-inch pipe line along the curb, fed from the city supply. The hose bibs are about 100 feet apart to allow attach-

FIG. 4. STONE CAR, MOTOR CAR FOR HAULING CEMENT, ETC., AND TRAILER CAR FOR HAULING SAND

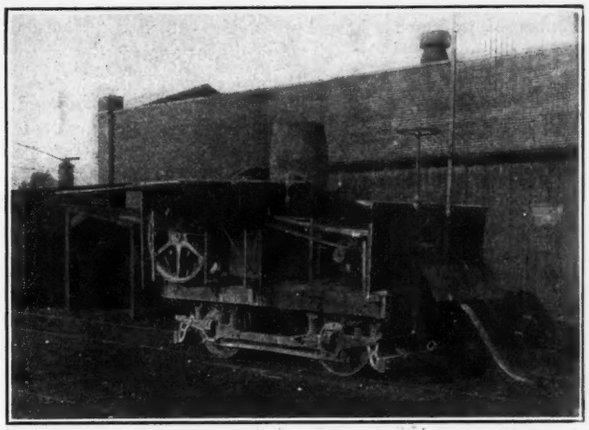


FIG. 6.—CONCRETE MIXER CAR, SHOWING MOTOR ATTACHMENT

ment as the mixer moves along with the work. Concrete, when mixed, is dumped into the space between the rails, spread and tamped in one layer, especial care being taken to have it thoroughly tamped under the rails and the proper space along the rail left to give full thickness of top surface in the grooves for the car wheels. The base is brought to proper surface by a templet having the same crown as the surface of the pavement and 1½ inches below the finished surface, allowance of ¼ inch being made for tamping. The templet is provided with a metal strip where the wear comes on the rail in smoothing the pavement. The cement is shaken from the empty sacks (the cement is delivered in cloth sacks) over the surface of the concrete base and the sacks are stacked in piles of fifty each in a dry place until returned to the store yard for proper return to the factory. The mixer is shown in Figures 5, 6 and 7, the last also showing the mixing and placing of concrete base.

The concrete for the top surface is mixed by hand in two boxes 10 feet long, 3 feet wide and 8 inches deep, placed alongside the track. Four sacks of cement and three barrows of granite constitute a mix for each box, about eight pails of water being used for this quantity. The concrete, when given three turns and properly wet, is delivered by scoops into the space to be paved and is spread by a templet resting on the rails. The portion outside of the rail is smoothed by a float, the form being a guide for levelling. Following the spreaders, the surface is smoothed by floats and trowels in a manner similar to sidewalk work. The concrete along the rail is then removed by trowel to provide for the wheel groove, after which the special grooving tool is passed over the rail to give the desired cross-section of groove. When the concrete has been in place for about one hour, the surface is marked into blocks by templets having a crown of ½ inch and shown in Figure 8.

TEMPLET FOR MARKING CROSS GROOVES

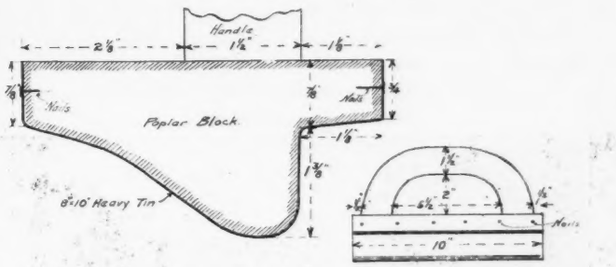


FIG. 8.—SPECIAL GROOVING TOOL FOR WHEEL GROOVES

The longitudinal grooves are made by a sharpened templet about 8 feet long. For paving on curves a 4-foot templet is used. Wooden mallets weighing 3½ pounds are used for making grooves, about three blows per groove being required. When the concrete is sufficiently set the surface is brushed by wall brushes attached to long handles, especial care being taken that particles of granite do not protrude at grooves after

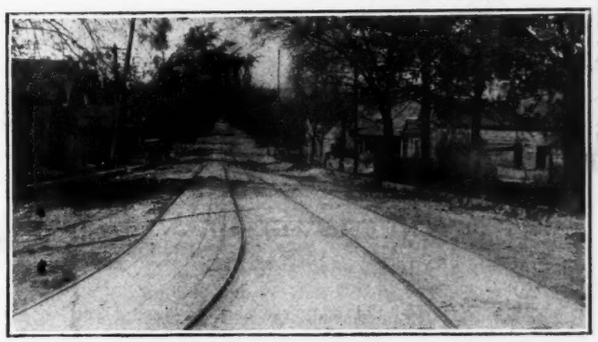


FIG. 10.—COMPLETED PAVEMENT

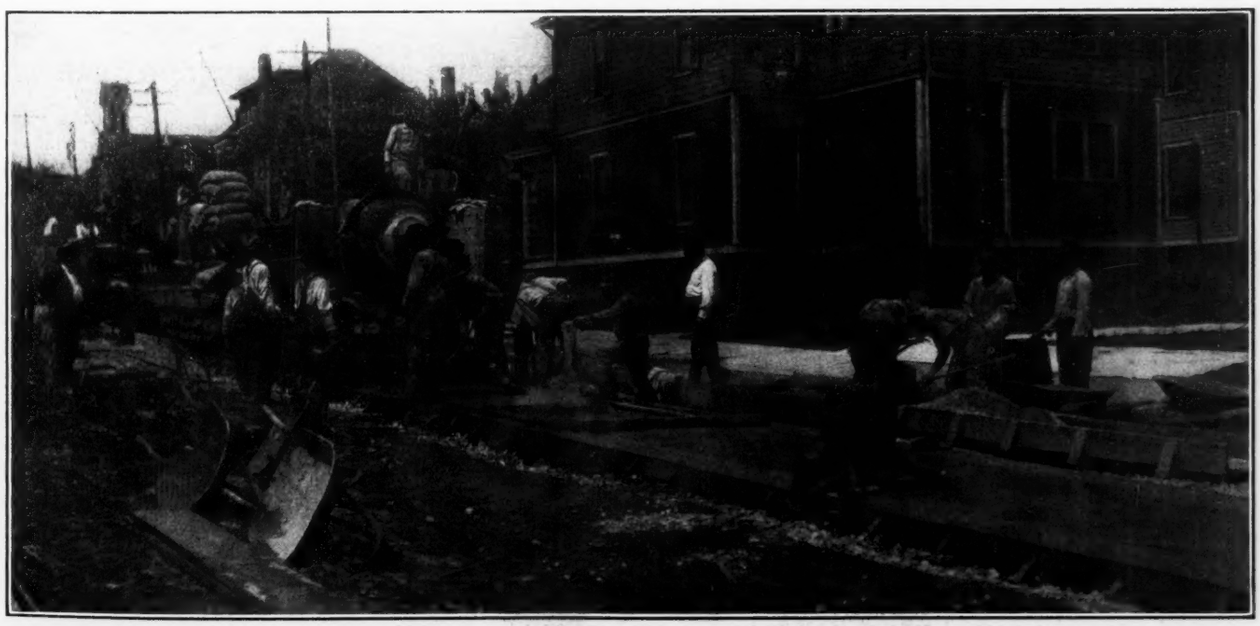


FIG. 7. PLACING CONCRETE BASE, SHOWING THE MIXER IN ACTION; ALSO THE MIXING OF TOP SURFACE MATERIAL

brushing. As a final precaution, the grooving tool is again passed through the wheel grooves to insure proper depth and width. Special tools and methods of installation of the top surface are shown in Figures 8 and 9.

During hot weather the finished pavement is sprinkled about three times each day for four consecutive days. In cooler weather, this time is reduced to two days.

When sprinkling is completed and the pavement properly dried the expansion material is placed, being heated to about 300° Fahrenheit and poured from a galvanized iron sprinkling pot with the sprinkler removed.

After the pavement has set for three days and been put in readiness for traffic, the blockades are removed and cars allowed to operate over the track. Teams are allowed over the pavement after the expansion joints have been placed.

The finished pavement is shown in Figure 10.

mixture is in some cases colored either black or dull red, and a number of pavements have been made with a combination of two or three colors. For private walks, octagonal tiles of somewhat smaller dimensions are used.

These tiles are laid directly on a foundation composed of cement and sand mixed in the proportion of one barrel of the former to a cubic yard of the latter; this being laid to a depth of 2 inches and rammed. The entire walk is therefore composed of 2 inches of mortar mixed about one to eight, and the 1¾-inch tile. The subgrade under this is previously compacted, but no very great pains is required because of its character, it being largely sandy loam, which compacts readily, but suffers practically no settlement by reason of soaking with water or otherwise. This character of soil and the practical absence of sufficiently low temperature to cause it to heave, or in fact to produce any appreciable freezing whatever, probably

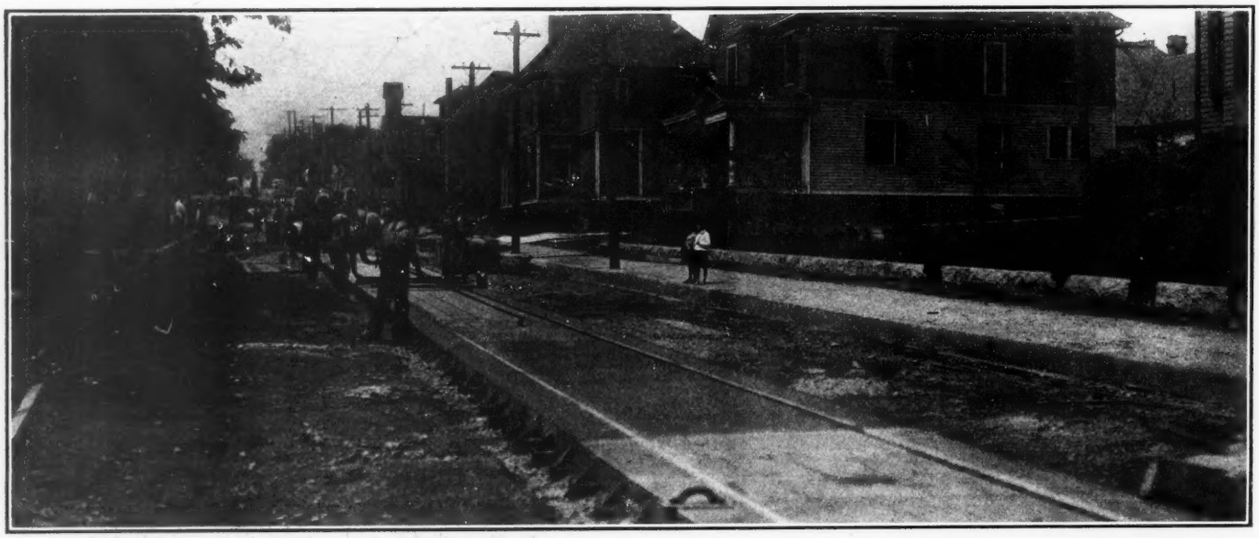


FIG. 9. LAYING THE CONCRETE BLOCKED PAVEMENT, KN OXVILLE

CEMENT TILE FOR SIDEWALKS

A striking illustration of the fact that a construction which is perfectly successful in one part of the country may not be so in another part, and the converse that because a certain construction has been unsuccessful under certain conditions of climate and soil it should not therefore be considered under other conditions, is offered by the cement tile sidewalks of Atlanta, Ga. The use of these has become so common of recent years as to be considered almost as a standard in that city. Tiles of cement and other materials have been tried in a great number of Northern cities, but we have seldom seen any which had not been thrown out of regular surface by frosts or roots or by unequal settlement of the foundation, and the use of any kind of flat tile for pavements has been practically abandoned in most cities. In Atlanta, however, tiles which had been down several years were found to be in excellent condition, and although we passed over miles of such pavement we failed to find one which departed to any appreciable extent from an excellent, smooth, plain surface.

These tiles are made octagonal in shape, 18 inches in their shortest diameter and 1¾ inches thick. The tiles are made in molds having a loose bottom. Properly prepared top surface mixture composed of one cement to one sand is first put in to a depth of ½ inch and thoroughly tamped. The bottom mixture is at once placed on top of this, being composed of one cement to three sand, and aggregate somewhat coarser than sand. This also is thoroughly tamped. The mixtures are made fairly dry, so that it is possible to remove them from the mold at once as soon as tamping is completed, this being effected by forcing the bottom of the mold up through the sides of the same, the tile then resting upon the bottom plate, from which it is slid onto a table, where it rests while seasoning. The top account largely for the excellent condition of the sidewalks, even after two or three years of service. These walks are laid by private contracts and paid for by the citizens, but the city awards a contract each year for constructing them, thus securing for the citizens a lower price than they could obtain otherwise. The contract price for this year was 84 cents per square yard.

LOCATING SIDEWALKS NEXT TO CURB

In some cities there is an increasing tendency to do away with the sodded strip between the curb and sidewalk paving by placing the paving directly against the curb and adding the sodded strip to that already existing as a continuation of the private lawn. This gives the property owners more lawn space between house and walk, which is appreciated by them, but is not so popular with the pedestrian.

Perhaps the most serious objection is that fire hydrants, hitching posts, telegraph posts and the like, which would otherwise occupy the sodded strip, form obstructions in the five or six feet of paving. Also private driveways which could rise from gutter to sidewalk level in the width of the sodded strip, and cross the sidewalk without a depression, must be carried as a depression across a part, at least, of the paved walk where this is contiguous to the curb. There are other objections, such as that the foot passengers are nearer splashing mud and flying dust, children are not so safe from passing teams, etc. As to the appearance of the street, this is a matter of taste. Some prefer the appearance of great width of street given by having the trees back from the curb; others, the arch of foliage extending over the roadway.

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DECEMBER 1, 1909.

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Concrete Mixing Machinery

CONCRETE, in its rapid advance toward a leading position among structural materials, has been passing through a history very similar to that experienced by iron. When the use of iron as a structural material was in its infancy practically the only form in which it was employed was that of cast-iron, the tensile strength of which was low, and the use was consequently restricted very largely to members which were under compressive strength only. Not only this, but there was no certain uniformity to be relied upon and consequently a high factor of safety was necessary. The present almost universal use of this material is the result of development along three lines—more general adaptability, requiring greatly increased tensile strength; lower cost of production, and reliable uniformity in essential characteristics; and in this the inventor of machinery has played an important part. It is doubtful whether the high grades of wrought iron and steel which are now produced would be possible except by the use of expensive machinery; and their manufacture into commercial forms certainly would not be.

The use of concrete is now passing through a very similar history. Twenty-five years ago the author of a standard book on masonry construction stated that concrete was "coming into very general use as a material for foundations"; and although it had been employed to a certain extent for low walls and certain other simple structures, such use was exceptional. As was the case with cast-iron, the tensile strength was low and the quality of the product was by no means of reliable uniformity. Concrete was made almost exclusively by hand at that time, and it was a common clause in most specifications that "all concrete shall be hand mixed; or if mixed by machinery the product shall be equally as good as that mixed by hand in the way specified." Possibly a few antiquated specifications still contain this clause; but the most modern ones either contain or imply the statement that all concrete shall be machine mixed; or if hand mixing be employed the product shall be as thoroughly and uniformly mixed as the machine output. Also a more general adaptability has been obtained by the use of reinforcement, generally of steel rods or wire, increasing tensile strength.

Development along both these lines is still progressing; but great advance has been made during the past five years. Machinery has been placed upon the market to meet the various requirements, and the wise contractor now no longer asks whether machine mixing is advisable, or even which is the best concrete mixer, but rather which concrete mixer is best adapted for the particular class of work in hand. In some cases a large amount of concrete is to be used within a limited area, as in heavy foundation work. In others, the condition is the same except that the concrete is to be used in walls and other structures requiring a more careful depositing of the material and an elevating of it above the mixer rather than depositing it below the same. In still other classes of work, such as pavement foundations, the concrete is deposited over considerable areas, requiring more or less transportation or else the use of a portable mixer. In some cases a continuous delivery of the product is most economical; in others it must be discharged into carts or wheelbarrows and continuous discharging is inconvenient. In some localities the contractor can find a vacant lot or other ground near the work, where he can establish a semi-portable plant; in others no such location can be found and either a small plant working in the street or a larger plant located near a railroad yard must be employed.

From this crude analysis of certain of the conditions under which concrete work is performed it is apparent that a wise contractor will make a careful study of the conditions and of the concrete machinery available for meeting them; for in his decision in this matter will often lie the difference between profit and loss on his contract. In the same connection there are a number of other points to be considered, such as the delivery point and method of transportation of the stone, sand and cement used. In some cases it will be cheaper to establish a plant at a railroad siding, where material can be dumped directly into bins and drawn from thence by gravity into the mixer, than to transport the material from the railroad to a mixer set up near the work under construction. In general, however, the latter is to be preferred from an engineering point of view because then the concrete reaches the work in a much fresher condition and without danger of undergoing preliminary set.

As between hand mixing and machine mixing, however, we believe there is now little dispute as to either efficiency or economy. Machine mixing, if properly supervised and if done by the use of almost any of the standard machines now on the market, is unquestionably more thorough and uniform than hand mixing; and where the quantity used is large there is undoubted economy also in machine mixing.

NOT UNIVERSALLY APPLICABLE

The articles in this issue are all descriptive of municipal work in which concrete is the chief or only material employed; or of appliances for constructing or handling that material. These indicate to some extent the great diversity of uses to which concrete is being put at the present time and the great importance of a correct knowledge of the principles and art of concrete proportioning and mixing. In this general use of concrete, however, there lies a danger that it will become a fad and that the material will be adopted for uses to which it is not inherently fitted or for which some other substance is better adapted because either of cheapness or more probably of greater suitability for meeting the requirements.

It is only natural that not only those commercially interested in concrete but also those who have become enthusiastic over its advantages for a great variety of work should carry their enthusiasm to the point of advocating it for structures or uses where it will give less satisfactory results than would some other material. Both classes of advocates will ultimately suffer by allowing themselves to be carried to extremes in this way; the manufacturers of cement and concrete machines even more than the engineers, since unsatisfactory results are apt to be attributed by the layman to concrete as a material when as a matter of fact the fault lay in its improper use, and the material will thereby receive an unjustified condemnation.

There seems to us to be at this time a real need for an urgent appeal to engineers and manufacturers to consider this matter seriously and, in choosing the material for any proposed structures or class of structures to ask themselves not "can concrete be used for these?" but rather, "is concrete the best material to be used?" We believe in concrete and that for certain classes of work it is by far the best material yet available to man. But we have our doubts about its being that most serviceable and best adapted for use in some classes of structures for which its adoption is being advocated.

There is another danger in connection with concrete to which we desire to draw attention. One of the advantages possessed by this material is the possibility of preparing it by cheap labor and thus making its use independent of strikes or shortage of labor among brick layers and masons. But this idea of cheap labor is too often carried too far and made to include cheap supervision also and cheap and makeshift methods and appliances. This idea that a number of semi-intelligent foreigners under a careless foreman can be furnished with a pile of cinders or piles of stone and sand and a car load of cement and with almost any combination of these materials and their labor will produce satisfactory concrete is too nearly approximated in a great many cases. Too often the concrete which goes into a retaining wall, for instance, is prepared and deposited almost as carelessly as the back filling which is thrown behind it. There is too little study of the aggregate, too little science in determining the proportion of mixture and too little care in securing such proportion in the actual mixing, in a large part of the concrete work being done at the present time. The last is perhaps the most serious of these, since it is subject to the greatest variation. Measuring by wheelbarrow loads cannot be called an exact method, and that by shovelfulls of material is even less so; and yet both of these methods are used very largely in place of the actual measurement of sand and stone in boxes or barrels which was required on most work a few years back.

But perfection of proportioning and mixing will still leave concrete possessed with certain characteristics or lacking in certain other characteristics which render it not the most desirable material for certain uses. It is time for engineers and other practical men to take serious thought of just what the characteristics of concrete are and in what respect it possesses such characteristics to a greater and in what to a lesser extent than do other structural materials. Then, knowing the material characteristics demanded by the uses to which a specific structure is to be put, select that material which best meets these requirements, be it concrete, clay product, iron or other material.

CONCRETE MIXERS

General Description of Continuous, Batch and Gravity Types —Different Shapes of Drums—Measuring and Loading Devices

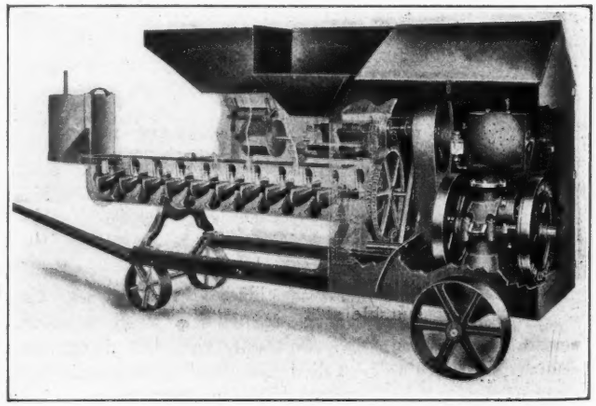
Concrete mixers may be classed according to their methods of operation into continuous, batch and gravity types. The simplest form of a continuous mixer, a simple iron trough with one or two shafts provided with teeth for mixing and propelling the material forward to the discharge end, has the advantage that it may be placed comparatively close to the ground, thus making the method of feeding simple and economical. Good results have been obtained by placing the men loading sand, stone and cement in such numbers and positions about the machine that, when working simultaneously as directed, the proportions of the mixture are kept fairly uniform without any direct measuring. However, the general criticism of such a simple form of mixer is that it does not produce as uniform results as a batch mixer.

The batch mixer is open to the objection that the processes of loading and discharging compel the men to halt in their work with the consequent result of idle time and expense. Manufacturers of both of these types of machine have been meeting the objections mentioned, the manufacturers of continuous mixers by installing measuring devices through which the cement, sand and stone pass and are measured, the manufacturers of the batch machine by the use of hoppers and elevators to cut down the time between batches or allow some part of the loading work to go on continuously.

Continuous mixers differ from each other in the number of shafts, in the number and shape of the teeth or paddles and in the shape of the mixing trough. Most of these mixers have but one shaft. The teeth in a mixer may be in two sets, one set for mixing and the other for propelling; or there may be only one set designed for performing both duties. One design of machine of the continuous type has no shaft or teeth, yet its method of operation puts it in this class. Instead of the ordinary trough an inclined rotating drum is used, inside of which are flights which mix and propel the concrete forward.

The mixing trough of a continuous mixer may be placed in a horizontal position or given a considerable incline. The feeding device is of great importance where high-class work is desired, and consists of hoppers, worms and pockets. These increase the height to which material must be thrown in loading, an objection which is trifling, however, in the case of small machines. Hence, this type would seem to be best adapted and is in common use for sidewalk work, where a product of from 50 to 75 cubic yards (say, 5,000 square feet) a day is sufficient. These machines are often mounted on trucks which also carry gasoline engines for motive power.

Among the mixers of the continuous type are the following: Advance, made by the Advance Concrete Mixer Co., of Jack-



A CONTINUOUS CONCRETE MIXER

son, Mich.; Bolte, made by the Bolte Manufacturing Company, of Kearney, Neb.; Eureka, made by the Eureka Machine Company, of Lansing, Mich.; Foote, made by the Foote Concrete Machinery Co., 182 LaSalle street, Chicago, Ill.; Gauntt, made by the F. G. Gauntt Mfg. Co., of Fort Wayne, Ind.; Grand, made by the Hall-Holmes Mfg. Co., of Jackson, Mich.; Monarch, made by the Monarch Mfg. Co., 307 Shepard Bldg., Grand Rapids, Mich.; Miles, made by the Miles Manufacturing Co., Inc., of Jackson, Mich.; McKelvey, made by the McKelvey Machinery Co., of Cleveland, O.; Perfection, made by the Cement Tile Machinery Co., of Waterloo, Ia.; Coltrin, made by the Knickerbocker Co., Jackson, Mich.

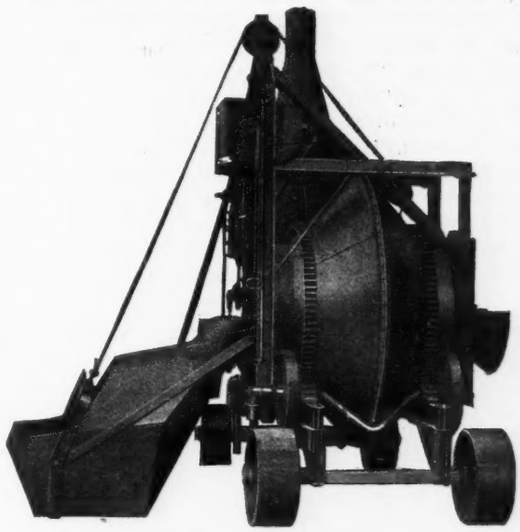
The original type of the batch mixer was the cube mixer named after General Gilmore, consisting of a cubical box measuring about one yard on each edge, often made of plank and lined with sheet iron, rotated on a shaft running through diagonally opposite corners. Material was put in and discharged through a door, thus necessitating the stopping of the machine in two positions. Owing to the shape of the receptacle the sand, stone and cement were tossed about and well mixed. No better quality of mixing is done by any machine and it is also true that there is no inherent virtue in the particular movements given to the concrete by the old cube mixers. This original shape is still adhered to by one of the large manufacturers, who has equipped the cube with the improvements of loading and discharging possessed by machines of other shapes. A slight improvement has been made in the original cube, that of rounding the corners which in the Gilmore mixer used to become clogged with mortar. The inconvenient features of the old doors have been eliminated by rotating the cube on hollow trunnions through which the materials are fed and discharged.

Most batch mixers have blades disposed in the interior of the drum which play a greater or less part in the mixing process. A polygonal drum formed by two truncated cones mounted on the heads of a cylindrical drum in such a way that the original axis of the drum is inclined at an angle of 45 degrees to the axis of the mixer is a variation in which the shape of the drum plays an important part in mixing. In still another device, a drum looking in section much like a clover leaf, the shape of the receptacle itself is depended upon to do the mixing. In some batch mixers of the drum type little dependence is placed upon the shape of the receptacle, the mixing being done by steel plates which lift and turn the concrete over, and which are staggered in such a way as to give the material a back and forth travel in the drum. Double cones are used in several batch mixers, the effect of their inside angles, which tend constantly to work the materials towards the center from the outside, being of service in accelerating mixing. Another batch mixer is made in which the mixing is done by steel blades attached to a shaft, the blades being fewer in number and larger than the teeth of continuous mixers. Still another design of drum mixer has a spiral cross-section and in this machine teeth also assist in mixing.

Besides varying in their mixing devices, batch concrete mixers have different ways for loading and discharging. If the mixer sits low, materials may be shoveled in directly in measured portions. The adding of the desired amount of water is a problem in batch mixers which does not occur in continuous mixers which are open, for the batch mixers are all to a greater or less extent closed. Hence the water is actually measured for each batch, while if the contents were exposed to view a pipe with a valve operated by hand would give satisfactory results. Where the hopper is too high for direct loading, in order to avoid the expense of constructing a loading platform and the labor of wheeling the material up to it, many batch mixers are provided with a charging hopper. This device, a sheet-iron box of suitable shape, is placed as near the ground as possible and loaded with material for a single batch, and is then hoisted up and discharged into the hopper.

In order to discharge a batch mixer it may be tilted so that the concrete rolls out by gravity or a discharge chute of special design adapted to the shape of the drum is inserted at the discharge end. With this, as desired, single wheelbarrow loads or the whole batch can be drawn out at a time.

A peculiar type of batch mixer, so peculiar as to almost form a class by itself, is the traction mixer. This consists of a drum which constitutes the body of a cart and is drawn by a horse, the drum being caused to revolve as the cart is drawn forward. The revolution is continued only as long as needed,

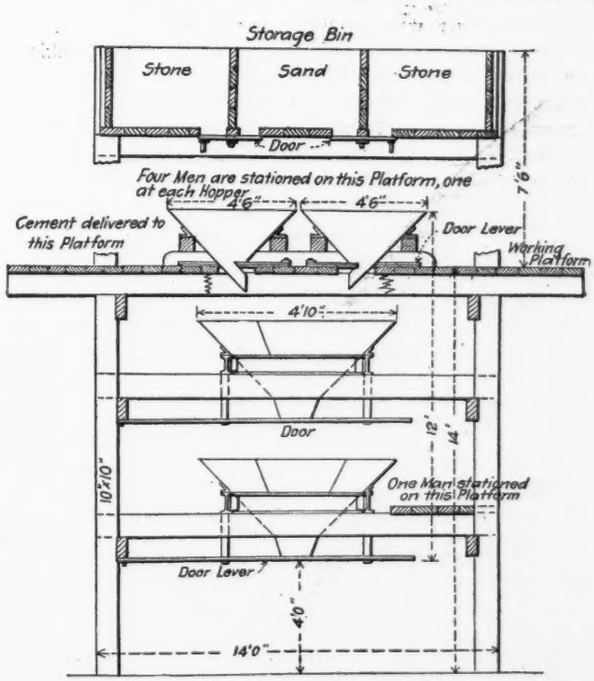


A BATCH CONCRETE MIXER

after which the cart is drawn to the work without unnecessary revolutions and consequent waste of power.

Among the batch mixers are the following:

American, made by the Cargill Mfg. Co., of Columbus, O.; Chicago Cube, made by the Municipal Engineering and Contracting Co., of Chicago, Ill.; Chicago, made by the Chicago Concrete Machinery Co., of Chicago, Ill.; Clover Leaf, made by the Clover Leaf Machine Co., of South Bend, Ind.; Foote, made by the Foote Concrete Machinery Co., 184 LaSalle street, Chicago, Ill.; Koehring, made by the Koehring Machine Co., of Milwaukee, Wis.; McKelvey, made by the McKelvey Machinery Co., of Cleveland, O.; National, made by the National Concrete Machinery Co., First National Bank Bldg., Chicago, Ill.; Chain Belt, made by the Chain Belt Co., Milwaukee, Wis.; Snell, made by the R. Z. Snell Mfg. Co., South Bend, Ind.;



A GRAVITY MIXER

Nims, made by the Barron & Cole Co., 127 Franklin street, New York, N. Y.; Polygon, made by the Waterloo Cement Machinery Corporation, of Waterloo, Ia.; Ransome, made by the Ransome Concrete Machinery Co., of Dunellen, N. J.; Smith, made by the T. L. Smith Company, 170 Broadway, New York City; X-L-All, made by the Burrell Manufacturing Co., of Bradley, Ill.

Gravity mixers are stationary and the ingredients of the concrete fall through a considerable distance, being thrown from one side to the other by baffle plates or teeth suitably placed. A gravity mixer of great capacity and economy in operation consists of a series of hoppers placed one above the other. The materials are placed in the top hopper and are dropped from one hopper to another, water being added meanwhile, and turn over and mix during their descent. Among the gravity mixers are the Fulton, made by R. B. Fulton, Red Cloud, Neb., and the Hains, made by the Hains Concrete Mixer Company, Union Trust Bldg., Washington, D. C.

COST OF CONCRETE PAVEMENT FOUNDATION

A CONTRACTOR of Milwaukee gives the following figures of cost of concrete foundation 6 inches deep in that city. This was mixed by a Koehring street paving mixer—a batch mixer of the revolving drum type provided with a charging hopper and with traction drive for moving itself forward with the work.

In the first instance the foundation was laid on a street where the operation of street cars and the narrow strips between track and curb were unfavorable conditions, with the following results:

Number of laborers,	22;	rate per day, $1.50;	total	$33.00
Number of foremen,	1;	rate per day, 4.00;	total	4.00
Number of engineers,	1;	rate per day, 4.00;	total	4.00
Number of water boys,	1;	rate per day, .75;	total	.75
Total cost				$41.75
Number of square yards of concrete, 6 inches deep				712
Cost per square yard				.058 cents

This does not include cost of fuel, oil, etc.

In another instance where conditions were more favorable and where there were no street car tracks, but where labor was higher, the following result was obtained:

Number of laborers,	22;	rate per day, $1.75;	total	$38.50
Number of foremen,	1;	rate per day, 4.00;	total	4.00
Number of engineers,	1;	rate per day, 5.00;	total	5.00
Number of water boys,	1;	rate per day, 1.00;	total	1.00
Total cost				$48.50
Total number of yards laid, 6 inches deep				1,086
Cost per square yard				.045 cents

A Texas contractor, using a similar machine, on a wide street where there were no street car tracks and where the road bed was hard so that it was not necessary to lay planking, laid 1,280 square yards of 4-inch concrete base in ten hours with seventeen men. This machine was operated by a gasoline engine so that no engineer was required and the laborers were all colored.

Number of laborers,	15;	rate per day, $1.65;	total	$26.40
Number of foremen,	1;	rate per day, 3.50;	total	3.50
Number of water boys,	1;	rate per day, .75;	total	.75
Total cost				$30.65
Number of square yards laid, 4 inches deep				1,280
Cost per square yard				.024 cents

A Kansas contractor reports laying a 5-inch base with the following force:

Number of laborers,	19;	rate per day, $2.00;	total	$38.00
Number of foremen,	1;	rate per day, 4.00;	total	4.00
Number of engineers,	1;	rate per day, 4.00;	total	4.00
Number of water boys,	1;	rate per day, 1.00;	total	1.00
				$47.00
Number of square yards of 5-inch base laid				934
Cost per square yard				.05 cents

Another contractor, using a mixer equipped with delivery boom and bucket for delivering the concrete, reported as follows:

Number of laborers,	15;	rate per day, $2.00;	total	$30.00
Number of engineers,	1;	rate per day, 5.00;	total	5.00
Number of foremen,	1;	rate per day, 4.00;	total	4.00
Number of water boys,	1;	rate per day, 1.00;	total	1.00
Total cost				$40.00
For half day				$20.00
Number of square yards of 6-inch concrete base laid in five hours				510
Cost per yard				.04 cents

CONCRETE SEWERS IN ATLANTA

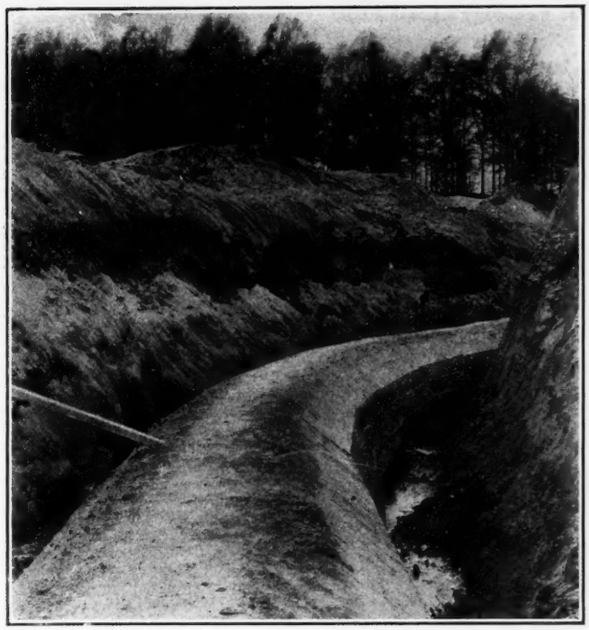
Built by Convict Labor—Basket Handle Shape Preferred to Circular—Stone from Trench Excavation and Sand from River Cost Little

FOR two or three years past the city of Atlanta, Ga., has been constructing its large sewers of concrete in place of brick, which material was previously the standard. Plain concrete has been used in each case, no reinforcement having been employed in any of the sewers. The latest concrete sewer, which has been completed only about a month, is known as the Emmet street sewer. This sewer is 4 feet 6 inches in diameter and discharges into the Orme street sewer, which is 10 feet in diameter and was built two or three years ago.

The Emmet street sewer is about 1870 feet long and is laid at a grade averaging about 2 per cent. While both this and the Orme street sewer are referred to as being 4 ft. 6 in. and 10 ft., respectively, they are not circular in section. The bottom of each is formed of two planes intersecting at the center, each having a cross slope of about one in four. The top of the sewer is a semi-circle, which is continued to the bottom planes by vertical walls. In each sewer the height from the lowest point of the bottom to the top of the arch is the same as the diameter of the circular arch, each being the dimensions given as the size of the sewer. The shape of the outside surface of the sewer differs somewhat from this, the arch having a somewhat longer radius and the sides being given a slight pitch outward. This results in the following dimensions in the case of the 10-foot sewer: Thickness of arch at highest point, 14 inches; thickness at springing line, 24 inches; thickness of side walls at bottom, 38 inches; thickness of bottom, 12 inches throughout. This section was adopted by Capt. R. M. Clayton, the City Engineer, because it was more easily constructed and apparently more substantial than a circular sewer, some difficulty having been experienced in properly placing and tamping the concrete under the haunches of sewers of circular cross-section. With the present construction, flat boards can be used as forms for all of the work except the inside of the arch, for which a centering is employed.

One unusual feature of this work is that all of the labor is performed by county convicts, for whose services the city makes no payment except that it pays from the general treasury a large part of the expense of maintaining the prisoners. As these convicts are practically none of them men with any experience or skill in either bricklaying or any other kind of construction work, they can be used much more readily on concrete sewer work than they could on brick, and this may, to some extent, account for the use of the former material rather than the latter.

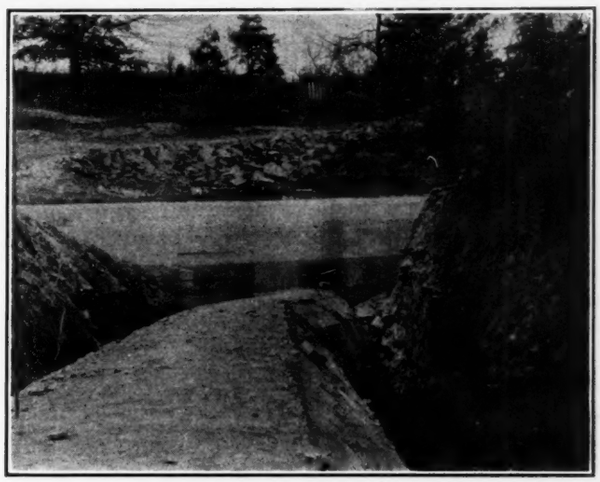
TANGENT ON EMMET STREET SEWER



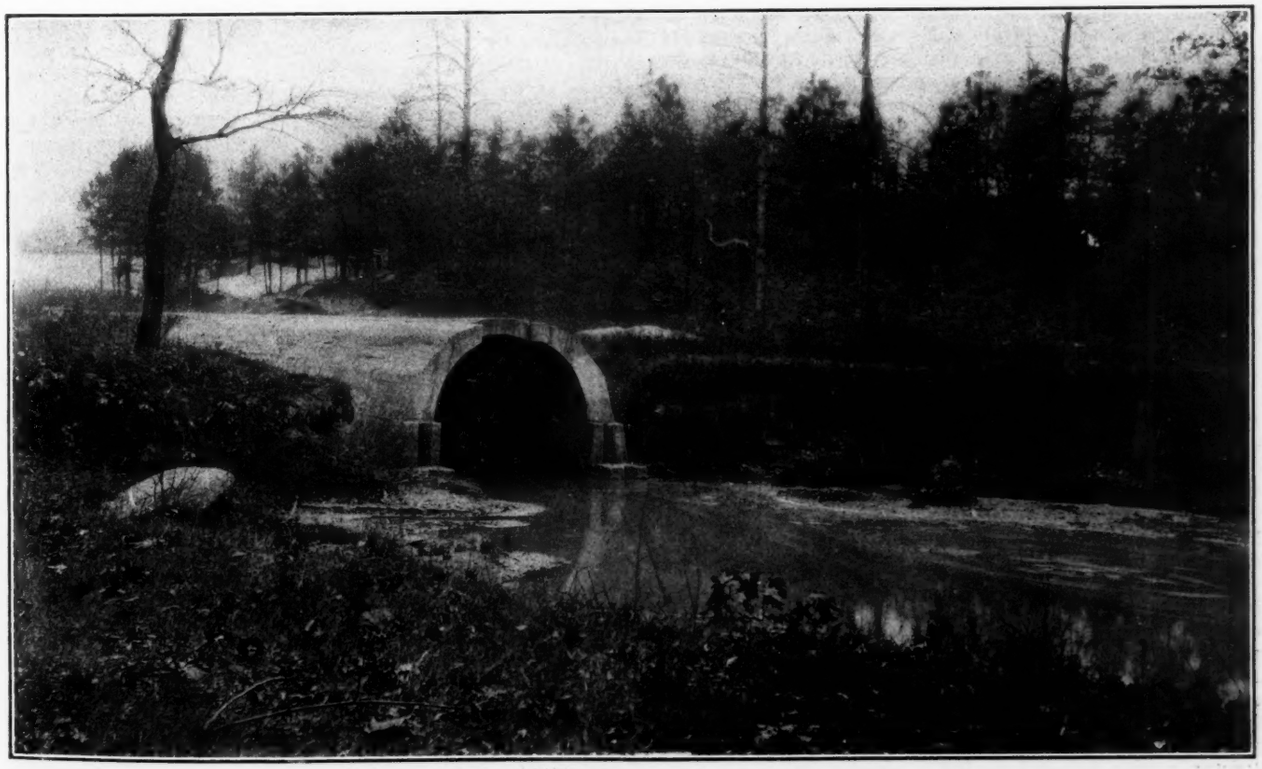
CURVE IN EMMET STREET CONCRETE SEWER

Stone for the Emmet street sewer was obtained from the excavation for the same and broken up by the city crusher, which was located along the line of the work. Sand was obtained from the river by the convicts and so cost the city practically nothing. Consequently about the only actual payment made by the city for this work was the cost of the cement, which was $1.65 per barrel delivered on the work. The concrete was mixed 1:2:4, and consequently the cement cost about $2.50 per cubic yard. When done by contract such work cost the city about $8 or $9 per cubic yard.

One of the illustrations shows the 4-ft. 6-in. Emmet street sewer at its junction with the 10-foot Orme street sewer. It is seen by this that the former enters the latter at practically the grade of the invert. In this condition the sewage would back up the smaller sewer for several hundred feet should the larger sewer become filled by a considerable storm. As the grade of the smaller sewer is about 2 per cent, it would, however, probably clean itself of any deposit which would be occasioned thereby. The smaller sewer would also be placed under a head of 4 or 5 feet in such event, which pressure might be sufficient to cause a rupture. Another illustration shows the outlet of the Orme street sewer and the considerable amount of sewage issuing from it. This photograph was taken during the unusual drought of the past fall, and the liquid shown is all house sewage. This flows for a considerable distance practically undiluted with clear water before reaching a real stream, and cannot but occasion a considerable nuisance. This is only one of nine outlets of this kind and illustrates the urgent necessity for some other method of disposing of the sewage of this city. Plans for disposal, bringing the sewage of these several outlets to three disposal plants, have been prepared by Hering & Fuller, of New York, and an election on the issuing of bonds for carrying out the project will be held about the middle of February. The cost of the disposal plants and intercepting sewers is estimated at about $1,350,000.



JUNCTION OF EMMET AND ORME STREET SEWERS



OUTLET OF ORME STREET SEWER, SHOWING VOLUME OF FLOW

The flow is composed entirely of very strong house sewage. Provision for keying another section of concrete sewer to the end of this one is plainly seen in the illustration

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest, Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance

ROADS AND PAVEMENTS

Cement Pavement Depressed by Lack of Travel

Arlington, N. J.—A number of depressions in the surface of the recently improved portion of Elm street, which was paved by the Hassam Paving Company, of Worcester, Mass., caused the property owners along that thoroughfare to complain to Street Commissioner John Durkin. The work was finished only a month ago at a cost to the town of $18,000. Five per cent of the amount was retained as a guarantee fund for two years. The Street Commissioner communicated with the paving company and some of the officials of the concern viewed the work. The latter said the depressions in the paving were to be expected on account of the small amount of travel over the road up to the present time. They contended that the frequent passage of vehicles would ultimately level the street. It is their custom, they said, to go over the work six months after its completion and make necessary repairs. This they promised to do next spring.

New Pavements to Be Intact Five Years

Chicago, Ill.—A conference of representatives of public service corporations was held in the Council committee rooms and it was agreed not to oppose the proposed ordinance providing that after a street is paved it shall not be disturbed for a period of five years. The representatives of the companies interested asked that they be given sixty days' notice of the paving of a street. The statement was made that if all the companies did their underground work at once it would make a bad mess and it was suggested that a system be worked out by which they be required to work successively at designated times.

Indiana Gravel Road Bonds Are Good

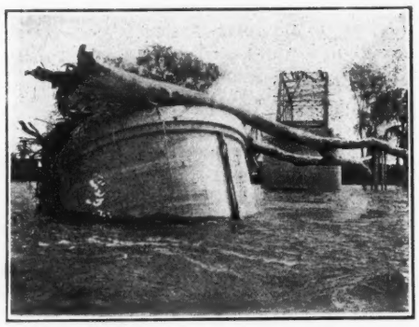
Indianapolis, Ind.—Bond issues aggregating from $5,000,000 to $10,000,000 already outstanding are not affected by the recent decision of the Supreme Court of Indiana declaring the three-mile gravel road law unconstitutional, according to the statement made by one of the supreme judges. The decision merely stops the present construction of highways under that particular statute and prohibits the future issue of bonds on such improvements, he declared. Different principles govern the validity of the bonds authorized on roads completed while the law was in force, the judge maintained.

Asphalt Plant Made of Junk Works Well

Omaha, Neb.—"To build an asphalt repair plant that will astonish the engineering world," says City Engineer George W. Craig, "take a group of junk yards, an abandoned grain elevator, a dismantled alfalfa mill, some old boards and sheet iron, a few ancient cog wheels and assemble them properly." Mr. Craig was speaking of the repair plant located on Nicholas street which works over old asphalt pavement. To go into further detail: An asphalt mill is used for grinding up the old asphalt and it is fed by a bucket elevator. From the crusher the material goes to a rotary tank in which is a worm mixer. The tank is heated by direct fire and prevented from overheating by a jet of steam turned inside. From the tank the material goes to a mixer where 2 per cent of asphalt is added. From this it is loaded on to wagons. This plant turns out enough remade asphalt every day, when working full time, to pave 300 yards of street two inches deep. Counting all costs of hauling to and from the yard and all labor cost at the plant, the expense of the 300 yards is $57.75. Week in and week out the cost of the product is about 21 cents a yard, laid on the street, but if we add the cost of getting the old asphalt to the city yard, the cost reaches 37 cents a yard. For its product the city asphalt repair plant collects $1.60 a yard from the street railway company or any private contractor it may do patching for.

Rebuilding Gianella Bridge

Hamilton City, Cal.—A conference of the Supervisors of Glenn and Butte counties was recently held at the site of the Gianella bridge which was washed away last spring and is being rebuilt. Precautions for the safety of the new bridge were discussed. The pier that was undermined during the last high water has not been removed, but the coffer dam has been put in place and the work of taking out the pier has commenced. Concrete work will be put around the dolphin shortly.



Courtesy Sacramento Bee

UNDERMINED PIER

Nickel-Steel Bridge For St. Louis

St. Louis, Mo.—Pittsburg is to furnish the material for the largest nickel-steel structure in the world. It will be the municipal bridge across the Mississippi, which is to be built by the city of St. Louis. Seventeen thousand tons of nickel-steel will be required, for which approximately $100 a ton, fabricated and erected, will be paid, aggregating about $1,700,000. It was originally intended to build the bridge of ordinary steel, of which 24,000 tons would have been necessary. However, the engineers finally decided upon nickel-steel, because of its greater strength, about 33 per cent, and because less material would be required and the bridge would be much lighter. Three concerns put in bids—the American Bridge Company, the McClintic-Marshall Construction Company and the Pennsylvania Bridge Company. The American Bridge Company was the lowest bidder and secured the contract. The nickel-steel will be made by the Carnegie Steel Company at the Homestead works. The structural shapes will be rolled at the same mills and then forwarded to the American bridge works at Ambridge for fabrication. Work on the assembling of the material will begin soon. In the meantime the approaches and piers for the bridge will be built by other contractors. It is expected that the bridge will cost, complete, about $2,500,000.

Ohio Highway Record

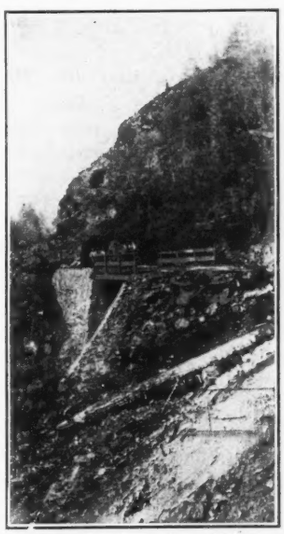
Columbus, O.—Ohio has built nearly twice as many miles of improved highways this year as last and practically without additional cost. This is shown by the annual report of State Highway Commissioner J. C. Wonders, filed with Governor Harmon. The standard of the work is of a superior character. The present system of inspection enables the Commissioner to keep a closer watch on contractors and to secure from them better figures and a higher class of work. In 1908 about 32 miles of new roads were constructed and in the past year this was increased to 63 miles of new highway. The amount expended for good roads was $534,645, of which $194,866 was contributed by the State. During the year applications for 53 new roads were granted to 36 counties, and 15 counties which did not apply the year before came in this year. Commissioner Wonders quotes from the report of the Massachusetts State Highway Commissioner that: 'The advent of the automobile has doubled the expense of maintaining the State highways." This is declared to be the most destructive agency known to the roads. He advocates the adoption of a general plan of pike repairs and road maintenance modeled after the system in vogue in France, which he says is of the greatest efficiency and the least expensive of any extant.

Will Lay No More Macadam Roads

Trenton, N. J.—Declaring that tests have proved bituminous methods to be best, State Road Commissioner Frederick Gilkyson asserts that New Jersey will build no more macadam roads and that pavements superior to ordinary asphalt can be laid at from $1.15 to $1.50 a square yard. The wear of speeding automobiles upon macadam roads caused the State Road Department to realize the urgent necessity of providing a new road surface that would be dustless, waterproof and hard enough to defy the effect of auto wheels, and resilient enough to give comfort in riding. A campaign of education in road reform was adopted and now the State has 85 miles of bituminous roads and specifications prepared for 13 more.

Highways in Washington

Olympia, Wash.—Two systems of highways are being built in Washington, one by the State alone, the other by the State and counties. The State has 1081 miles of highways surveyed and it is estimated that 10 years will be required to complete the work. The average cost per mile is $6,000. Where the counties and State join in building a road each pays half the expense. There is twice as much of this class of work contemplated as of the State work. Counties will continue to do work in addition to this. The reproduction shows the substantial character of the work being done, as well as giving an idea of the wild scenery through which the highways run. Although the bridge is of wood, the abutments are of substantial masonry, capable of carrying a heavier superstructure.



Courtesy Portland, Ore., Tribune

A WASHINGTON STATE HIGHWAY

Boulevard System Proposed

Dayton, O.—In connection with the work of straightening the Miami River, City Engineer F. J. Cellarius has suggested that a system of boulevards be planned. The levees on each side of the river, from Washington street to Seaman street, where the great Miami boulevard intersects, would have to be rebuilt with retaining walls so widened on top to conform to the levees that will be constructed in the river improvement. The plans now call for levees from Washington street south to the city limits, on each side, wide enough for a roadway and sidewalks, besides a row of trees to shade and protect it from overflow. This arrangement extended up the river as far as Lehman street would result in having a continuation of the great Miami boulevard extending from Riverside to Stillwater avenue.

State Commissioner Encourages Local Road Work

Batavia, N. Y.—At a meeting of the Board of Supervisors, State Highway Commissioner Hooker advocated a policy which, he said, would minimize the work of the Highway Commission, that of towns taking up road work and building the roads themselves. He believes that a large saving over State-built roads would ensue. Good roads, he said, could be built in many towns for $4,000 a mile. The grades might not be as even but the road itself would be as good. Of necessity, the State roads would cost more, owing to the surveys, contractors' profits and the need of expensive supervision of construction. Town and county highway superintendents were competent to supervise the work.

Moves for Municipal Asphalt Plant

Pittsburg, Pa.—One more step was taken toward the installation of the proposed new municipal asphalt plant when Select Council passed a bill to condemn and purchase the Peabody property as a site.

SEWERAGE AND SANITATION

City Saved Money By Making Cement Pipe

Natchez, Miss.—Speaking of the matter of making tiling for drainage work in Natchez, Alderman William Steitenroth, at whose suggestion the city bought molds for the manufacture of cement tiling or pipes, said that the city has saved at least two-thirds the amount that would have been paid out for the purchase of the pipe. This includes the cost of material and labor. This is not vitrified pipe, but cement pipe, which is entirely different from the vitrified article. At present the city is paying $1.50 per barrel for cement and $1 per cubic yard for sand. The pipe is made under direction of Street Commissioner Rutherford.

To Enlarge Power of State Health Board

Annapolis, Md.—A recommendation has been made by the Commission on Hygiene and General Health of the State to Governor Crothers for the passage of an act by the Legislature to increase the appropriation of the State Board of Health on account of tuberculosis and to extend further scope of its work.

Further recommendations are: For the reorganization of the Board into five bureaus to have supervision of different parts of the work and to provide a sufficient amount for the maintenance of the bureaus. To provide for the proper supervision of water supplies and sewerage; to create the office of sanitary engineer and to provide for the employment of sufficient draftsmen and inspectors. An appropriation of $1,000 a year for issuing a popular health bulletin.

Difficulty in Regulating Ragshops

Chelsea, Mass.—The increase of ragshops in Chelsea is causing apprehension among citizens who believe the conflagration last year was caused by the inflammable character of the 60 or more such establishments in the city. Notwithstanding regulations regarding ragshops adopted by the Board of Control soon after the fire, subsequent events have nullified practically all these rules and the city to-day is applying no restrictions to the establishment of shops. The Board of Control's ordinance required ragshops to be licensed by the chief of the fire department. The Supreme Court decided the ordinance unconstitutional, and Chairman McClintock announced that the Board of Control would at once draft a new ordinance to protect the city from the menace. This proposed new ordinance, however, has not been forthcoming. Meanwhile the rag dealers are taking advantage of the inactivity of the Board of Control in the matter. There are now in Chelsea about 40 ragshops, or within 20 of the number that were there at the time of the conflagration.

Regulate the Sale of Vegetables and Milk

San Francisco, Cal.—The Supervisors have framed two ordinances for the protection of the health of the city. The first provides regulations for the inspection of dairies and the second for the inspection of truck gardens. The dairy regulations are offered as an amendment to the ordinance already on the statute books and will give to the guarantee, "inspected milk," something more than a mere name. The regulations provide that all dairies delivering milk in San Francisco before they can use the label must apply to the Board of Health between July 1 and 15 for an official inspection. An official will be sent to the premises and if they are found to be sanitary he will issue a certificate. Before the milk is sold it must be placed in sealed cans and cooled to a temperature of 50 degrees Fahrenheit and delivered to the consumer at not under 55 degrees. The cans must be sealed and bear on the seals: "Inspected." The truck garden ordinance provides for the inspection of places where vegetables are grown so as to prevent the use in irrigating of water which may be contaminated by sewage. It is made a misdemeanor to offer for sale vegetables that have been so irrigated and the health officials are made responsible for enforcement of the law.

Must Report Vital Statistics

Topeka, Kan.—Physicians who fail to report births will hereafter be prosecuted to the full extent of the law according to statements of members of the city Board of Health who have been advised by the State Board of Health and Attorney General Jackson.

Philadelphia Wars on Typhoid

Philadelphia, Pa.—In an address at the Philadelphia College of Pharmacy, Dr. A. C. Abbott, Director of the Hygienic Laboratory of the University of Pennsylvania, and former Chief of the Bureau of Health, drew some striking comparisons between the present mortality rate from typhoid fever in Philadelphia and that which existed five years ago. In that time, he declared, by simple municipal measures, such as water filtration, strict supervision of the milk supply, and the cleaning up of river banks, the number of cases of typhoid fever had been reduced by fully 80 per cent. Nearly one-half of the remaining cases are imported from other places by Philadelphians returning from their vacations. Still stricter regulation of dairies, the thorough disinfection of all sewage refuse, and, most important of all, the greatest personal care in the treatment of typhoid patients were urged as sure preventives of the disease. The use of uncooked vegetables raised on land fertilized with unsterilized sewage; the eating of raw oysters, not cleanly washed or handled, and the fly pest, which was characterized as a "filthy, intolerable nuisance, a disgrace to our civilization," were emphasized by Dr. Abbott as easily avoidable causes of the spread of typhoid. Vaccination, as a means of becoming immune to the disease, was described as entirely practicable and effective.

Disposal Plant Exceeds Guarantee

Reading, Pa.—The sewage disposal plant is now taking care of all the city's sewage and a total of 4,300,000 gallons is being handled daily, which is 300,000 gallons more than required of the contractor.

WATER SUPPLY

Question As To Low Bidder

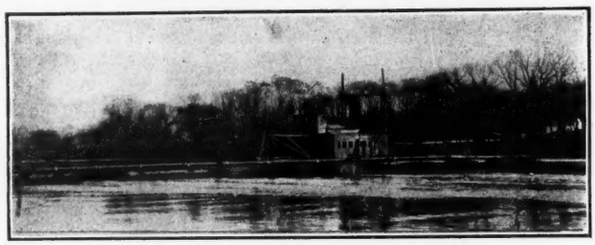
Newburgh, N. Y.—When the contract for laying the new 30-inch water main from Washington Lake to West street was about to be let a question was raised as to the low bid. The Hudson Terminal Construction Company was about $4,000 low on the face of the figures, but their bid for rock excavation, of which there was estimated to be 150 cubic yards, was $14 per cubic yard, a much higher figure than those given by other bidders. On the assurance of City Engineer Blake that it was hardly possible that the rock work could exceed his estimate sufficiently to make the Hudson Terminal Construction Company's bid higher than any of the others, the contract was awarded to it.

Record Speed in Masonry Work

Kingston, N. Y.—More masonry was placed in the Ashokan dam at Brown Station, near Kingston, N. Y., during October than has been laid in the same length of time in any other similar structure in the world. The figures for the monthly estimate of MacArthur Brothers Company, and Winston & Company, the contractors, show that 35,259 cubic yards were placed, adding to the dam a mass of masonry about 800 feet long, 120 feet wide, and 10 feet high. The nearest approach to these figures in any similar case is the record made a year ago at the Croton Falls Dam, when about 26,000 cubic yards of masonry were put in place in one month. In the irrigation work of the Reclamation Service in the West, the highest monthly progress was 18,000 cubic yards on the Roosevelt Dam. This latter figure was approximately equaled by MacArthur Brothers Company in the course of building the Wachusett Dam for the Metropolitan Water Works in Massachusetts, and at the Boonton Dam for the Jersey City water supply. The enormous amount of work done at the Ashokan Dam in so short a time is considered by those in charge of the work as indicative of the adequacy of the contractors' plant and equipment to build the reservoir in even less than the contract time allowance. The masonry in the dam was begun the last of September, 1908, and up to the present time about 150,000 cubic yards have been laid. The completed structure will contain about 500,000 cubic yards.

Dredging Preliminary to Pipe Laying

Belleville, N. J.—Without obtaining permission from the Riparian Commission to cross State land, although holding a permit from the Government, the Hudson County Water Company, in its scheme to supply Staten Island with subsurface from this State, began dredging operations preliminary to laying pipes across the Passaic River at Belleville, where its wells are located. Cognizance was promptly taken of the move, and an application for an injunction made to the Court of Chancery. The dredge used is of the suction type, the ejection pipes twisting snakelike on pontoons nearly to the Bergen County shore, then returning to the Belleville side, where they discharge onto land that is being filled.



Courtesy Newark News

HUDSON COUNTY WATER COMPANY'S OPERATIONS

Cleaning Reservoir Necessary but Inconvenient

Canastota, N. Y.—With the reservoir supplying the village of Canastota with water out of use, by reason of its undergoing a thorough cleaning, the village is without adequate fire protection and the utmost care must be observed in the economical use of water. Only the auxiliary pumping system on the Lawyer farm is now supplying the village, and this system barely supplies enough water for the ordinary needs, while there is not force enough to throw an effective stream in case of fire. That the water in the mains would be completely exhausted by a few minutes of fire fighting is the opinion of the local firemen. It is figured that the removal of refuse will increase the capacity of the reservoir fully 35 per cent.

Water Works at Oakland, Md., Finished

Oakland, Md.—The new water works and sewerage system for Oakland, begun last spring, is practically completed. Contractor William Tunny is ready to turn the work over to the town authorities. George E. Fairley, of the firm of Penniman & Fairley, Baltimore, who have been the engineers in charge of the town's interests, in company with the supervising engineer, J. Ray Fisher, have made a test of the water pressure in all sections, and it has generally been satisfactory. The water is of fine quality, and is obtained from a series of artesian wells. The pressure insures ample fire protection.

Valuation of Richmond, Ind., Water Works

Richmond, Ind.—Dabney H. Maury, of Peoria, Ill., an expert employed by the city of Richmond to examine and pass on the value of the plant of the Richmond City Water Works Company, submitted his report to the Council. The city under the terms of the company's franchise has the right to purchase it at any time, and it is understood that the incoming administration will seriously take up the proposition of the ownership of the water plant, though the company does not desire to sell and asks a new franchise. The expert's opinion is that the actual value of the plant as it stands, including its business as well as its tangible property, both real and personal, is approximately $717,000. The big problem that will face the city in the event of the decision to purchase will be the matter of financing the project without exceeding the statutory limit of bonded indebtedness.

Spring Valley Company Offers to Sell

San Francisco, Cal.—At the eleventh hour and on the eve of the proposed Hetch-Hetchy bond election, the Spring Valley Water Company, with the authorization of its Board of Directors, has made the Supervisors an offer to sell its properties to the city—either all of them at a valuation to be fixed by arbitration, or its city distributing system and 500 acres of its Lake Merced lands for $19,420,750. In connection with the latter alternative the company proposes to sell to the city water at wholesale in various stated amounts for successive terms of years, apparently in quantity sufficient to meet the growing needs of the community, and at a price ranging from 15 cents to 12 cents a thousand gallons, the price decreasing as the quantity of water to be delivered increases up to 100,000,000 gallons daily in 1917.

STREET LIGHTING AND POWER

Village May Pay More for Lights

Addison, N. Y.—According to J. S. Hubbs, secretary of the Addison Electric Power Company, Addison, a town of 2,000 inhabitants, is getting its street lights cheaper than any other town of its size in the country. The price has been $65 per arc light per year and the contract is about to expire, hence the secretary has written a letter to Joseph Gibson, president of the village, quoting statistics to support his statement and explaining why the village ought to pay his company $10 more for light per year for a renewal of the contract.

Question of a Perpetual Franchise

Elgin, Ill.—The existing grant to the Western United Gas and Electric Company expires December 31, 1910, and Alderman C. H. Pegler suggested at a Council meeting that the city should open negotiations with the company at the earliest possible time. The company, however, claims that it does not have to ask for a new franchise, basing its claim that its rights are perpetual on the following clause: "It is hereby guaranteed that, upon the expiration of the privileges hereby continued the said Elgin American Gas Company, or its assigns, shall have equal rights and privileges with any other gas company which may be formed for the purpose of supplying said city of Elgin with gas."

Tests of Gas and Electric Meters

New York, N. Y.—The Public Service Commission makes the following report of meters tested in October:

GAS.

Complaint meters	Number	Per ct.
2 per cent or more fast	129	40.8
2 per cent or more slow	30	9.5
Between 2 per cent fast and 2 per cent slow	157	49.7
Total	316	100.0

ELECTRIC.

Complaint meters	Number	Per ct.
4 per cent or more fast	1	3.4
4 per cent or more slow	2	6.9
Between 4 per cent fast and 4 per cent slow	26	89.7
Total	29	100.0

Plan for Lighting Wide Street

Washington, D. C.—In his annual report, Electrical Engineer Walter C. Allen says that Pennsylvania avenue, with its roadway 105 feet wide, requires different treatment from any other street in the city. This avenue has large trees in line with which the present arc lamp posts are placed. The branches of the trees interfere with the lights. It is necessary to have the lamps low in order to get them below the branches. The result is uneven and inefficient illumination, and heavy shadows now reflect on the sidewalks. The Electrical Engineer accordingly recommends that lamps be placed on posts in the roadway on islands of safety which need not be more than six feet in diameter.

Sees Big Saving In Municipal Light Plant

York, Pa.—The Light Committee has submitted to Council a bid for lighting the streets for a term of five years for $60 per arc light per year, and current for other purposes for 10 cents per kilowatt. The committee further states that it has been investigating the subject of municipal lighting plants and believes that it can save the city from $10,000 to $20,000 a year by establishing such a plant. Authority to obtain further detailed figures was granted by the Council.

Courtesy Atlanta Georgian

ILLUMINATION OF PEACHTREE STREET, ATLANTA, GA.

FIRE AND POLICE

Cohoes Annual Fire Record

Cohoes, N. Y.—The annual report of Fire Chief T. C. Collins gives the record of fires and alarms as follows: Bell alarms, 59; telephone calls, 42; still alarms, 14. Fires at which hose was used, 44; extinguished with chemicals, 54; without hose or chemicals, 16. Fire in brick buildings, 32; in frame buildings, 68. Total building fires, 100; other fires, 14; false alarms, 1. Amount of insurance at risk, $2,303,914; insurance loss, $28,565; loss not insured, $1,941.

Elizabeth Fire Chief Has New Auto

Elizabeth, N. J.—Fire Chief August Gerstung has received his new automobile from the Buick company. Although the car is capable of high speed the Chief does not expect to break the speed laws and make record trips.

Courtesy Elizabeth Journal

ELIZABETH FIRE CHIEF AND HIS NEW AUTO

Elmira City Hall Burned

Elmira, N. Y.—Elmira's comparatively new municipal building, one of the finest in this part of the State in point of appearance and valued, with furnishings, fixtures, records, etc., at close to $200,000, suffered a severe loss by fire November 18, which was not subdued until the top floors and part of the second floor were destroyed, and the loss will aggregate $50,000, which amount is covered by only $15,000 insurance. The building as it now stands necessitates the removal of all the offices to various parts of the city. The only severe loss in the matter of papers, equipment, records, etc., was suffered by the City Engineer's Department and the Board of Education. The apartments of the Board of Health suffered considerable damage and many valuable records were destroyed.

Councils Will Reorganize Fire Department

Harrisburg, Pa.—Councils have adopted a resolution providing for the reorganization of the Fire Department, the betterment of its condition and the weeding out of objectionable persons. In discussing the resolution it was mentioned that the police were sometimes remiss in seeing that the street cars stopped when apparatus was moving on the same street.

Fire Whistle Abolished

Hutchinson, Kan.—The Commissioners have decided to abolish the practice of sounding alarms with the fire whistle. The initiative in the matter was taken by the managers of the telephone companies who say that when an alarm sounds half the town calls up central to ask where the fire is, the result being that for the time the service is badly crippled.

Police Auto Burns

Omaha, Neb.—The celebrated $5,000 steamer automobile of the Omaha Police Department is a pile of scrap iron. Officer Bausenek is dying, six horses have been burned to death, two patrol wagons destroyed and the police stables wrecked. The explosion of the gasoline tank under the machine brought about all of the trouble. The gas from the tank, which leaked owing to the loss of the plug, communicated with the fire in the automobile furnace and an explosion followed. The loss is estimated at $12,000.

Camp Hill Has New Fire House

Camp Hill, Pa.—The new fire house of the Camp Hill Fire Company has been dedicated and occupied. The outside dimensions of the house show the width is 25 feet and depth 50 feet. There are two stories, the first of which is divided into three rooms, one for the apparatus, 23 by 34 feet, the others for meetings and lockers which are 14 feet square and 9 by 14 feet, respectively. The walls of the apparatus room are finished with red pressed brick and white enamel bricks, and the woodwork is painted in similar colors to harmonize. The meeting room is wainscoted and finished natural. The locker room has 14 lockers, which will accommodate the fire paraphernalia of 28 active members. Other toilet equipment is to be found in this room. On the second floor there is but one large room 48 by 23 feet, which will be used for public meetings, festivals, fairs and entertainments. The seating capacity of this room, which is plastered and wainscoted, will be about 300 people. Provision is made for electric and gas light. The heating arrangements for the present will be by the means of stoves, although a hot water heating plant will be installed as soon as it can be afforded. The contract price of the building was $3,375, exclusive of the cost of ground, furniture, lighting and heating facilities. With the latter specifications added the cost of ground and building complete will approximate $5,000.

Courtesy Harrisburg Patriot

May Increase Pay of Firemen and Policemen

Louisville, Ky.—Councilman Black will introduce an ordinance increasing the salaries of patrolmen, and Councilman Martin will introduce a bill increasing the pay of firemen. The new ordinances will make the following increases:

Patrolman, from $85 to $100; Mounted Patrolman, from $100 to $115; Secretary, from $75 to $100; Sergeant, from $100 to $110; Lieutenant, from $120 to $125; Detectives, from $105 to $110; Matron, from $40 to $50.

Firemen, from $85 to $100; Lieutenant, from $90 to $105; Captain, from $95 to $110; Engineer, from $90 to $105; Secretary, from $90 to $100; Superintendent of Alarms, from $100 to $125; Assistant Chief, from $120 to $135; Chief, from $175 to $200.

Topeka's Annual Fire Record

Topeka, Kan.—With the exception of the year 1904, the last fiscal year, 1908-9 has been the worst year in the history of Topeka for disastrous fire losses and fatalities. The loss last year was $298,025; in 1904 it was $391,000. There were four large fires at which the losses were due largely to natural gas. A majority of the fires were caused by bonfires and burning rubbish. Fires of unknown origin were 35. Sixteen blazes were caused by chimneys and stacks burning out and natural gas contributed sixteen to the record. Fourteen fires were due to incendiarism and the same number were attributed to carelessness. The expenses of the department for the year were $46,047.

GOVERNMENT AND FINANCE

Committee Recommends Salary Increases

Atlanta, Ga.—The Salaries Committee of Council has recommended that the following increases be made: Sanitary Chief from $2,400 to $3,000, city investigator from $1,500 to $1,800, second assistant city engineer from $1,600 to $2,000, city engineer's draughtsman from $600 to $900; third assistant engineer from $1,100 to $1,200, salaries of bookkeepers in comptroller's office from $1,650 to $1,800 and from $1,400 to $1,600, clerks in tax collector's office from $1,200 to $1,500 and from $1,500 to $1,800, tax investigator from $1,350 to $1,800, street improvement collector from $1,500 to $1,800, recorder pro tem from $1,200 to $1,500, live stock inspectors from $1,000 to $1,200, assistant fumigator from $900 to $1,000, city warden from $1,350 to $1,500, custodian of auditorium from $1,000 to $1,500, assistant electric light inspector from $900 to $1,000.

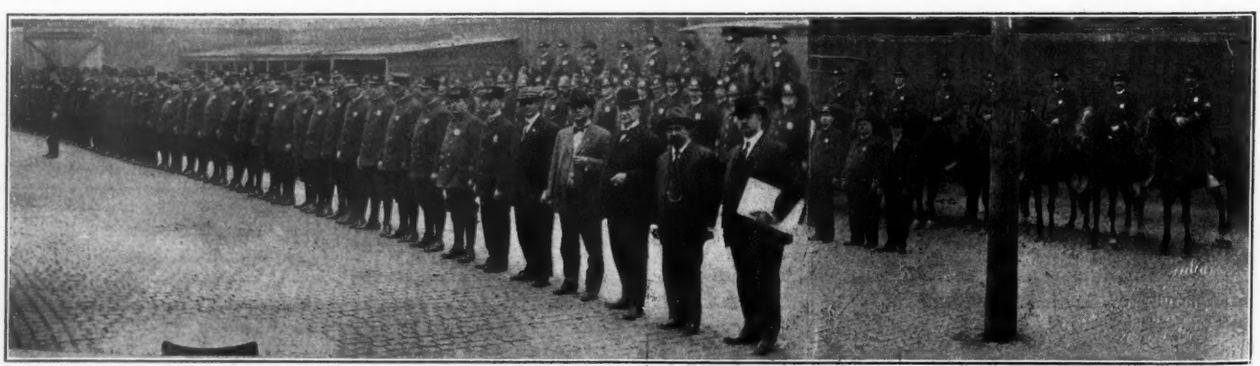
To Regulate City Officials' Hours

Dayton, O.—A new schedule of office hours has been devised for the city under the Paine law, which promises to facilitate the work of the departments and the convenience of the public. As outlined by Mayor Edward E. Burkhart, a fixed program of hours for receiving the public and one for conferring with the department superintendents will be carried out. The system in supplanting the present method will unify the administration and avoid the friction that occasionally occurs between the different departments. The health officers, the city infirmary department, superintendents of garbage, workhouse, streets, construction, water works, etc., will thus have office hours in the city building just as the department heads. The plan has been outlined at the meetings of the Board of Control, and is considered a much better one than that in force in some cities, in which the Board of Control, in stated session, will require a weekly personal report from each of the department superintendents. The new program will be put into effect at the beginning of the new year. The office hours will soon be determined.

Baltimore Is Economically Administered

Baltimore, Md.—The following figures showing the economical administration of the Baltimore city government have been compiled by W. H. Maltbie. He says that Baltimore is the most economically run city in the country. The column "average city" refers to the average of the fifteen largest cities, the figures being taken from Census Bureau reports:

Items.	Average city.	Baltimore.
General government; i. e. Council, Mayor, board, financial offices, legal offices, elections, care of buildings, courts	$1,067,449	$832,316
Protection of life and property, police, militia, Building Inspector, etc	2,542,283	1,828,590
Health, sewerage, garbage, street cleaning, etc.	980,550	722,900
Highways	974,155	734,250
Charities and correction	689,061	570,005
Education	2,695,714	1,810,452
Recreation	368,664	264,253
Miscellaneous—general expenses	223,818	15,513
Cost of public service enterprises—water, markets, docks, etc	699,924	561,928
Interest on debt	1,921,768	1,638,540
Payments to sinking fund	3,248,514	1,713,129
Outlays for permanent improvements	5,592,165	3,537,640



Courtesy Atlanta Georgian

ATLANTA POLICE FORCE AT DRESS PARADE PRECEDING SEMI-ANNUAL INSPECTION

The inspection was conducted by Chairman Carlos Mason, Commissioners Johnson, Spratling, McEachern and Kilpatrick, Chief Jennings, Assistant Chief Jett and Captains Beavers, Norman and Shepard

Waste in City Purchases

New York, N. Y.—William Hogo, Chief Inspector of the Central Supply Committee attached to the Department of Finance, has returned from Washington, D. C., full of facts and data with regard to the standardization of supplies and purchases for municipal use. The city purchases some $15,000,000 of such supplies every year, and Mr. Hogo thinks that a very large sum can be saved the city by careful and honest purchasing methods. The inspectors under Mr. Hogo discovered that fancy glass globes billed to the city at $3.75 could be purchased at $1.25 retail, and that lubricating oil sold to the Fire Department at 32 cents a gallon was being sold to the Water Supply Department and the Board of Education at 60 cents. Many other similar instances of waste were found.

Lynn Charter Prepared

Lynn, Mass.—A voluntary association of citizens has framed a charter for Lynn, patterned after those of Haverhill and Gloucester, which will be presented to the Legislature. The Mayor is to be Commissioner of Safety, and as such will have control of the following departments: Police, fire, electrical, health, poor, legal, claims, weights and measures, city messenger and license commission.

Oakland Increases Territory

Oakland, Cal.—By a vote of 7,928 to 160 in Oakland and 2,179 to 837 in the outside districts, the territory known as Brooklyn outside and Oakland townships outside, was annexed to Oakland. The old area of Oakland is 24.09 square miles and the annexed territory is 36.68 square miles.

Texas Town Votes Against Commission

Orange, Tex.—The election on the commission form of government for this city resulted in 32 votes for and 232 against the proposition. No names of candidates were printed on the tickets, although a few names for Mayor and Commissioners were written on them.

City Engineer Not Responsible for Supervision

Salt Lake City, Utah.—According to arrangements made by the Board of Public Works, the City Engineer will be relieved of responsibility for the supervision of public work. Plans will be kept in the office of the Board of Public Works. According to the statutes, the Engineer is not under the Board of Public Works in any way. In the matter of inspection of materials, the Engineer is still responsible so far as the accuracy of reports which he will make to the Board of Works is concerned.

Ordinance Codification to Be Made

Waco, Tex.—Bids will be asked for soon for the codification of the civil and criminal ordinances of the city of Waco for the past ten years. This work will be done under the personal supervision of City Attorney Lud Williams and he estimates that one man working ten hours a day will be required to labor four months to complete the task.

STREET CLEANING AND REFUSE DISPOSAL

Will Remove Snow from Sidewalks

Grand Forks, N. D.—The following ordinance has been adopted requiring the cleaning of snow from sidewalks:

That the occupant of each and every lot or parcel of land, and owner of each and every unoccupied lot or parcel of land within the city, adjoining any street, and along which sidewalks have been built, shall clear the sidewalks on or along such lots or piece of land of all accumulations of snow and ice, within ten hours after the same has fallen or accumulated, or by 2 o'clock in the afternoon of the following day if the same shall have fallen in the night time, and shall keep such sidewalks free from accumulations of snow. Provided, that no person shall be required to clean said sidewalks during the continuance of any snow storm or on Sunday. Any person who shall violate the provisions of this section shall, upon conviction, be subject to a fine of not less than $5 or more than $25 and a like fine for every day's continuance of such failure to observe the provisions of this section.

Suggests Ovens for Burning Waste Paper

New Britain, Conn.—The Health Board acted upon the petition referred to them concerning an ordinance requiring the construction of ovens for the burning of waste papers, etc. The Health Board considered that the constructions of such ovens would work a hardship in residential sections. They recommended that the Board of Public Safety take up the matter with the Health Board, and that action was taken.

To Keep Wooden Blocks Clean

Philadelphia, Pa.—Contractor Edwin H. Vare states that when the repaving of Market street is completed that thoroughfare will be one of the cleanest streets in the world. A sweeper will be stationed on each block during the day to keep his section of the street in proper order, while at night sweeping machines and scrapers will remove the heavy dirt from Sixteenth street east to Delaware avenue.

RAPID TRANSIT

Sues to Annul Franchise

Beaumont, Tex.—City Attorney Marvin Scurlock has filed suit in the District Court to forfeit the several franchises under which the Beaumont Traction Co. operates its street car system over the streets of Beaumont. A suit for damages was also filed by Mr. Scurlock on behalf of the city seeking to recover $35,000 for damages alleged to have been done to the streets and paving by reason of the faulty and defective construction of the car tracks, it being alleged that this is the cost of repairing such streets. In the forfeiture suit the chief grounds are failure to comply with conditions of the franchise by properly constructing the track on concrete foundation and for failure to operate the cars upon a schedule defined in the franchises and for various and sundry other alleged violations of the terms of the franchise.

Wants $10,000 a Year for Use of Street

Hoboken, N. J.—In connection with its new trolley terminal near the Lackawanna Railroad Station, the Public Service Corporation has planned to build an elevated structure over Hudson place. At a meeting of the Common Council a representative of the company was informed that the use of this small street would cost the company $10,000 a year. There is a question pending in the courts as to whether the city owns the street in question.

Strap Hangers Pay Three Cents

Houston, Tex.—The City Council has passed an ordinance providing a fare for strap hangers on Houston street cars. The full fare may only be collected when a seat is furnished. The practice known as 'bell cutting" is prohibited.

Must Have Heat in Cars

New York, N. Y.—The surface and "L" railroad corporations have been ordered by the Public Service Commission to keep their cars properly heated in cold weather. This ordinance is supposed to be in force between October 15 and the following April 15 in each year, but the mild fall weather has not obliged its enforcement. The Commission has not overlooked the subject and there have been several hearings before Commissioner Eustis. E. G. Connette, Transportation Engineer of the Commission, reported several weeks ago that a large proportion of the electric cars were without proper heating equipment. The companies must rush the work of putting them in shape to comply with the order.

Gets Ideas Before Granting Franchise

Oswego, N. Y.—City Clerk Thomas Dewine has compiled copies of street railroad franchises granted by the cities of Syracuse, Cleveland, Auburn and Chicago, at the request of the City Attorney, who, after a careful examination, has compiled a report of recommendations, which he believes should be acceded to by the Syracuse, Lake Shore & Northern Railroad Company before granting that company a franchise for the extension of its lines from Syracuse to this city. Among the suggestions offered by City Attorney Culkin are that a limited franchise be granted for not less than fifty years, nor more than seventy-five years, that the city receive a percentage of the gross receipts of the company, that the trolley poles carrying the wires shall be ornamental and shall be erected and approved of by the Commissioner of Public Works and shall also be so constructed as to carry electric lights.

MISCELLANEOUS

Good Time for Fireworks Ordinance

Albany, N. Y.—The Common Council has adopted a fireworks ordinance, and at a time when none of the local dealers have a stock of fireworks on hand, and when nobody is wrought up about celebrating Independence Day in the customary noisy and irrational manner, and hence at a time when there was likely to be little or no public opposition to the imposition of restriction on Fourth of July celebrations. The ordinance prescribes substantially that fireworks of no more perilous a character than firecrackers shall be discharged on Independence Day, and, therefore, should the ordinance become a law, the noise-making, perilous fireworks will be wholly eliminated.

Would Abolish Office of Town Sealer

Cortland, N. Y.—A resolution to have the law in relation to town sealers of weights and measures amended so as to abolish the office of Town Sealer and to place the compensation of the County Sealer of Weights and Measures on a salary basis instead of the fee system, has been unanimously passed by the Board of Supervisors.

Safeguard for Blasting

Jersey City, N. J.—At a conference held in the office of Prosecutor Garven, in Jersey City, the representatives of the Millard Construction Co. that is making the cut through Jersey City Heights for the Erie Railroad Co. consented to employ an engineer to be selected by Chief Engineer Van Keuren, of Jersey City, to have absolute charge of the blasting. The reckless blasting has injured a number of persons.

Minneapolis Has New Civic Center Plan

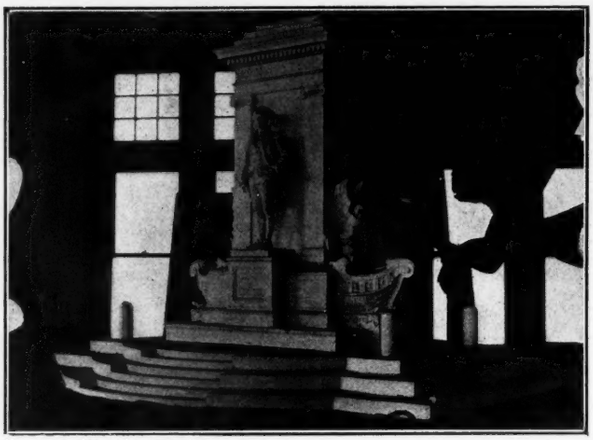
Minneapolis, Minn.—A new civic center plan has been presented at a meeting of the Publicity Club. It takes in the Union and Milwaukee stations, the new Postoffice, the Gateway Park and the City Hall. From the Union station a broad esplanade occupying the two blocks of river bank property between First and Third avenues S. is proposed. The block between First and Second streets and Second and Third avenues is to be purchased, thus giving a direct entrance to the new postoffice site in the block directly south. To bring in the City Hall the west half of the block directly across Washington avenue from the Milwaukee station is to be secured and all the block across Fourth street from the City Hall, with the exception of the Corn Exchange building on Fourth avenue and Third street. Much of this property, it is argued, can be purchased cheaply, as the buildings are old. It is also planned to have a subway between the Milwaukee and union stations for the conveyance of freight and passengers. The proposed Third avenue bridge will enter into the scheme and it will give people using it not only an excellent view of the civic center, but will allow them to reach any of the public buildings with little trouble.

The Flag Question

Newark, N. J.—An echo of the recent controversy over the displaying on the exterior of the City Hall of flags of Italy and Japan on the occasions of the celebration of Columbus Day and the visit of the Japanese Commercial Commission, was heard in Council when Mr. Congleton introduced a resolution on the subject. It provided that in future no flag other than the official flag of any State in the Union or the Stars and Stripes shall be displayed on whatever occasion, from the exterior of any public building within the jurisdiction of the Mayor and Common Council. The measure was passed unanimously.

Plumbing Code to be Made Modern

Trenton, N. J.—For the purpose of making the plumbing code of Trenton meet the demands of modern plumbing progress, the Board of Health has made a revision of the present code. Under the existing code plumbers have taken a number of new plumbing methods for granted. The new features will be provided for in the new code, which reduces to writing authority for certain work heretofore verbally given by the Plumbing Inspector. When the new code is completed it will be generally along the lines of the codes of New York, Philadelphia, Rochester and other important cities.



Courtesy Washington Star

STATUE OF JOHN PAUL JONES

Paul Jones Statue for Potomac Park

Washington, D. C.—The model of the statue of John Paul Jones, by Charles H. Niehaus, has been approved. When the statue is completed it will be placed in Potomac Park, on the new boulevard recently laid out along the river front, south of the White House.

Plans Presented for Lynn's New Harbor

Lynn, Mass.—Engineer D. D. Barlow, of the Atlantic, Gulf and Pacific Company has delivered to City Engineer George I. Leland plans and the engineers' report of the proposed development of Lynn harbor. The plans show the opportunities for reclamation of 311.6 acres, 39 acres of which are northeast of the Market street channel. A system of wharves of different lengths and widths are pointed out, fronting on 1,000-foot channels with an anchorage basin of 125 acres which has a turning width of 2,000 feet. All piers are to be of timber and wooden piles and are designed for a load of 400 pounds per square foot. The estimated cost of reclamation is 18¼ cents per square foot. Numerous questions were asked by different members of the city government, and an answer to practically every query made is contained in the report of the engineers. In opening the report the engineers declare that the bottom of the harbor is generally stiff blue clay, with a little coarse gravel here and there, making dredging a comparatively easy undertaking. Two channel locations are shown, one following the present government channel, hugging the Nahant peninsula, and the other to the west along the Saugus river channel. In the system of 14 wharves arrangements are made for all kinds of shipping, and with the latest methods of railroad freight transportation connected therewith. Numerous streets and areas for factory sites are also set forth, and an exhaustive study of the sewage disposal problem is also submitted.

To Reform Street and Numbering System

Grand Rapids, Mich.—Grand Rapids will undertake radical reform measures with reference to its streets. The block system of numbering houses will probably be adopted, with the river as the dividing line east and west, Michigan avenue and West Bridge street north and south. It is also proposed to call all east and west thoroughfares avenues and the north and south thoroughfares streets, and no names will be duplicated.

Mayor Discharges City Employees

Waukegan, Ill.—As a result of the defeat of a $55,000 bond issue, Mayor Fred Buck ordered all street lights put out of commission and the Fire and Police Departments reduced to two men each. For one day the city was run on this basis, then a mass meeting of citizens demanded a new bond election and the reinstatement of the police and firemen. The Mayor at first said that if the people wanted a new election they would have to put up $295 cash for it, but later he abdicated.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Defective Sidewalk—Evidence—Negligence

Jackson vs. City of Grinnell.—A pedestrian who, though knowing that a sidewalk was defective, believed, and as an ordinarily prudent person had a right to believe, that he could use it with safety, is not negligent in failing to select another route of travel, though there were better walks which might have served his purpose, unless in the light of the circumstances as known to him the route he took was imprudent. Whether it was prudent for a pedestrian to use at night a defective sidewalk depends on the inferences to be drawn from the condition of the walk, the darkness of the night, the extent of the pedestrian's knowledge of the condition, and the facts proved, which should appeal to the judgment of a man in the exercise of ordinary care, and the issue is for the jury. Where testimony was admitted without objection or exception, it was proper to give an instruction pertinent thereto. In an action for injuries to a pedestrian on a defective sidewalk, it is proper to show that, on examination soon after the accident, the materials of the walk were found to be rotten, as bearing on the condition of the walk at the time of the accident, and on the question whether the defect had existed so long that the city by reasonable supervision ought to have discovered and remedied it.—Supreme Court of Iowa, 122 N. W. R., 910.

Contracts—Competition—Fire Alarm System

Grace vs. Forbes, Mayor, et al.—Laws 1909, requiring an opportunity for competition in bidding on municipal contracts, is violated in spirit, where such opportunity is given in form only, and not in fact. Where specifications for a central office fire alarm system were so drawn as to confine all possibility of bidding to one company, though there was at least one other engaged in the same business, there was an utter failure to comply with Laws 1909, requiring an opportunity for competition in bidding on municipal contracts, and a contract let to such company is void. The fact that competitive bidding on a municipal contract as required by statute is prevented is in itself presumptive evidence of injury to taxpayers. Where, in a taxpayer's action to restrain performance of a municipal contract, he shows illegal action by the municipality, he is entitled to the assistance of the court, and it is immaterial that the person really interested is a competitor of the company to whom the contract has been let.—Supreme Court of New York, 118 N. Y. S., 1062.

Delegation of Authority—Plumbing Inspection

Ex parte Grey.—Where the charter of a city grants to the Mayor and Common Council the power to appoint a Board of Plumbing Examiners, such power cannot be delegated to the Board of Police and Fire Commissioners, or to any one else. Act March 9, 1887, amending the act approved March 3, 1885, made it unlawful for any plumber to work in any city until he had obtained from the Board of Health of said city a license to be issued after satisfactory examination by the board. Held, that the law was general, and applied to every Board of Health in every city in the State, and a city ordinance attempting to delegate to the Board of Police and Fire Commissioners the power to appoint a Board of Plumbing Examiners to examine and license plumbers is void.—Court of Appeal, California, 104 P. R., 476.

Special Assessments—Validity

Fisk vs. City of Keokuk et al.—Where, in proceedings attacking a special assessment for a street improvement there was a judgment that the assessment was not invalid, and an appeal therefrom was dismissed, the assessment must be treated as valid, and the property owner must be deemed to owe the same, unless the claim is barred by limitations. A property owner cannot attack the sale of land for nonpayment of a special assessment for a street improvement, or have the certificate of purchase set aside, without paying, or offering to pay, the amount of the assessment, with legal interest.—Supreme Court of Iowa, 122 N. W. R., 896.

Water Franchise—Free Water for Schools

Henderson Water Co. vs. Trustees of Henderson Graded Schools.—The supplying of water and light by a municipality is a "necessary expense," and is a power necessarily and reasonably implied in its general grant of powers, and can be exercised unless expressly forbidden, but the mode prescribed in the charter is exclusive. Even if a contract with a water company were ultra vires of a municipality because its Board of Commissioners had not power to make a contract for 40 years, the company will not be permitted to recover contrary to its express stipulation in the contract to supply water free of charge to public schools as upon a quantum meruit for water furnished the schools. The fact that compliance with the requirement of a contract by a water company with a municipality to furnish free water to public schools is burdensome to the company is no reason for changing its relation to it after performance, and permitting it to recover therefor. As the acceptance of an ordinance granting a franchise completes a contract which binds the municipality not to interfere with rights granted, so, likewise, it binds the grantee to discharge the duties imposed. A water company cannot properly complain of the requirement in its contract with a municipality that free water be furnished public schools on the ground that the municipality furnished the consideration supporting the contract and could not legally do so for the benefit of the schools, since it was entirely competent for the company to so agree, unless it thereby disabled itself to perform its duty to the municipality. The requirement of a contract by a water company with a municipality that it furnish free water to churches, public schools, town offices, market houses for city use, and all other town offices, cannot, as to the public schools, be avoided because such schools are controlled by a corporate body other than the municipality. A water company is not relieved of the requirement of its contract with a municipality that it furnish free water to public schools by the fact that other children than those living in the municipal limits are permitted to attend the schools. The requirement of a contract by a water company with a municipality that it furnish free water to public schools does not include water for sprinkling lawns, playgrounds, or for bathrooms or bathing pools, but only for drinking purposes, for toilet, and water-closets. The requirement of a contract by a water company with a municipality that free water be furnished public schools relieves the municipality from all liability for water furnished for necessary purposes, and no charge can be made for children attending the schools who live outside the municipal limits.—Supreme Court of North Carolina, 65 S. E. R., 927.

Street Obstructions—Nuisance

Pickrell vs. City of Carlisle.—Streets, including the pavements of a town, belong to the municipality for the use of the public traveling upon them for their whole length and width. Any permanent structure built upon any part of the public streets which interferes with their use by the public may be abated by the municipality, or be abated by the courts, at the instance of the town. The public will not be heard in equity to complain of an abutting owner's act in obstructing a street, which does not unreasonably interfere with the public's use of a street for travel. A lot owner may acquire by prescription an exclusive right to occupy a public street with his building or partial obstruction. Plaintiff erected in front of his house steps which extended upon the sidewalk. A former owner maintained an obstruction of the same character at the same place for more than fifteen years prior to 1873. Others on the same block and in other blocks, where the sidewalks were narrower, were allowed to maintain other similar partial obstructions. Held, that the steps were not a purprestur and a public nuisance, which could be abated, the present owner having the right to maintain them, having an easement to continue the obstruction maintained by the former owner, or one no more an obstruction, and the fact that others maintained like obstructions was evidence that it was not unreasonable, but was a common custom. What is "common" is generally known to all. A town may prohibit the erection of steps extending upon the sidewalk by a general ordinance of uniform application.—Court of Appeals of Kentucky, 121 S. W. R., 1029.

NEWS OF THE SOCIETIES

National Municipal League and the American Civic Association.—The seventeenth annual convention of the league and the fifth of the association were opened for a four days' session at the Sinton, Cincinnati, O., November 15. City Solicitor E. M. Ballard welcomed the convention in behalf of the City of Cincinnati in the absence of Mayor Galvin. Mr. Ballard spoke of the difficulties by which office holders are surrounded. The office holder is, for instance, between those on one hand who demand parks and boulevards and other things to make the city beautiful and on the other hand the taxpayer who objects to the cost of those beautiful things. He said he would not have fair and deserved criticism one whit abated, but it has become so popular to impugn the principles of men who are elected to municipal office by a political party, and indiscriminate and unreasonable criticism of public officials merely because they are officials, has become so common that he wished to voice a protest against it. Elliot H. Pendleton, Cincinnati, spoke on behalf of the 42 organizations which acted as the host during the conference. He said there had been a great civic awakening in Cincinnati, and the results had been most encouraging. The levy for school purposes is now twice what it was four years ago. Medical inspection has been provided, manual training and the teaching of civics has been introduced and the merit system applied to the selection and promotion of teachers. Through the efforts of the Woman's Club, playgrounds have been established, the new waterworks have practically eliminated typhoid fever, the purity of the milk supply has been greatly improved. Horace E. Deming, New York, chairman of the executive committee, since its inception, 15 years ago, responded to the addresses of welcome, and spoke of the progress of the league. President J. Horace McFarland of the Civic Association, Harrisburg, Pa., delivered his annual address, choosing the subject, "The Intimate Side of Conservation." The strictly municipal side of this subject deals with the question of human conservation as illustrated in the recent Pittsburg survey. Chas. J. Bonaparte of Baltimore, President of the league, discussed the initiative in the choice of municipal officers. The problem which he set himself to solve was: What shall take the place and fulfill the purpose of a committee on nominations when a city has to choose its ruler by popular vote. Work could be done either by a party primary or preferably for the entire electory by a self-constituted committee or association of citizens. The speaker would like to have every voter appearing on the registration lists to be affiliated with a political party given a blank slip when he receives his official ballot at a legal election and required to write in his own hand on this slip while he prepared his ballot in the booth the name of a leader for his party in the city during the next year. These slips will be put in a separate ballot box provided for each party and publicly counted by the regular officers of election. The person receiving a plurality of the votes so cast would become a party leader for the ensuing year. The three or five persons receiving the next largest vote should make up an advisory committee. The sole duty of the leader would be with the advice of the advisory committee to place names on the regular ticket. On the second day of the convention Secretary Clinton Rogers Woodruff, reviewing the year's work, said that charter revising and form of nomination had been the most conspicuous tendency in a year of unparalleled municipal activity. A. Leo Weil, Pittsburg, Pa., read a paper on graft and the prosecution of grafters. He said one of the most powerful weapons against graft, though seldom, if ever used, is a suit to recover the property misappropriated. This is perhaps more effective than criminal prosecutions because it does not arouse sympathy for the family of the accused, who, though innocent, suffer disgrace when the head of the family is in prison. John Nolen, Cambridge, Mass., read a paper in which he held that the influence of comprehensive city planning upon the civic spirit is very direct and profound; it is, in fact, the main end of reform. Secretary Waterous of the Civic Association spoke of the establishment of parks in suburban districts, maintaining that if an appeal were made to the business instincts of the real estate man he could be persuaded to set aside a small percentage of his land for park purposes. Harold A. Capon, New York, spoke of water front development with a view to making them both useful and beautiful. At the evening session William S. Bennet, New York, spoke on the effect of the immigrant on municipal politics.

On the whole, the speaker's opinion was rather favorable to the immigrant, particularly in the matter of his independence of strict party lines. Former President Charles W. Eliot of Harvard University spoke on conservation of the resources of the country for future generations. James R. Garfield also spoke on the same subject. At the next day's session Miss Grace Abbott, Chicago, director of the League for the Protection of the Immigrant, spoke on immigration and the municipal problem. She advocated the giving of courses of lectures in foreign languages for the purpose of explaining the problems of an American city. She insisted that the patriotism of the foreigner is just as earnest and enthusiastic as the native born. Much attention was given to a paper by Prof. A. R. Hatton, Cleveland, dealing with the police problem. He outlined a scheme for police organization under State supervision. Richard Henry Dana, Cambridge, Mass., read a paper on "Taking Municipal Contracts Out of Politics." This, he said, would naturally result from the employment of more technically educated men under permanent tenure and efficiency. Prof. Robert C. Brooks, Cincinnati, spoke of the regulation of campaign funds. He thought that the laws covering this subject would soon be extended to all States. He spoke of the difficulty of getting at real complete statements, and advocated authority for going back of the names and figures on the return. Robert Treat Paine, Jr., Boston, discussing the elimination of party designations in municipal elections, referred to the good results obtained in his native city. Joseph N. Teal, Portland, Ore., read a comprehensive paper, giving the history and present situation regarding the inititive and referendum in Oregon. Mrs. Isaac L. Rice, New York, read an address in favor of a more sane observance of the Fourth of July. The subject of the damage done by smoke and smoke prevention was discussed by Herbert M. Wilson, Chief Engineer United States Geological Survey; R. C. Harris, of Toronto, and Mathew Nelson, of Cincinnati.

The officials chosen on recommendation of the committee on nominations for the Municipal League were: President, Charles J. Bonaparte, Baltimore; vice-presidents, A. Lawrence Lowell, Cambridge, Mass.; George McAneny, New York; Charles Richardson, Philadelphia; George W. Guthrie, Pittsburg; Walter L. Fisher, Chicago; Henry L. McCue, Kansas City; Thomas N. Strong, Portland, Ore.; treasurer, George Burnham, Philadelphia; secretary, Clinton Rogers Woodruff.

The new officers of the American Civic Association are: J. Horace McFarland, president, Harrisburg, Pa.; Clinton Rogers Woodruff, first vice-president, Philadelphia; William B. Howland, New York City, treasurer; Richard B. Waterous, secretary, Harrisburg, Pa.; vice-presidents, James R. Garfield, Cleveland, O.; John Wesley Hill, New York City; W. W. Hannon, Detroit; George W. Marston, San Diego, Cal.; Mrs. Edward W. Biddle, Carlisle, Pa.

Western Society of Engineers.—At the meeting in the society's rooms, Chicago, Ill., November 17, Chief Smoke Inspector Paul P. Bird read a paper on "The Smoke Problem of Chicago." The history of the Smoke Abatement Commission and its work were also reviewed. At first the work was largely educational but now the department is becoming more strict. Smoke has been reduced considerably by the railroads and by the stock yards and the greatest difficulty now is with the river boats. Dr. W. A. Evans, Health Commissioner, took part in the discussion following the paper and called attention to the great difference between the great sums of money spent to reduce the typhoid death rate and the small sums allowed for combatting the diseases due to impure air, although the deaths from the latter causes greatly exceeded the former.

Brooklyn Engineers' Club.—At the regular monthly meeting at the clubhouse, Remsen street, Brooklyn, N. Y., Walter E. Spear, Chief Engineer of the Department of Water Supply for the Borough of Brooklyn, read a paper on the "Long Island Water Supply." Under conditions of normal rainfall, and with adequate storage, he said, the sources of supply now available, if completely developed, will furnish a supply of good water sufficient for the needs of Brooklyn until 1913, and by overdrawing these sources, they will perhaps provide enough water, though of an inferior quality, to prevent a shortage until 1916, or even 1918. If during the next few years, however, there should be a period of deficient rainfall, Mr. Spear said, it will be impossible to prevent a shortage in the supply after 1912, even if an inferior quality of water is provided.

Engineers' Society of Western Pennsylvania.—At the regular monthly meeting in the Fulton Building, Pittsburg, Pa., J. H. Joupet, chief engineer of the Electric Welding Co., read a paper on "Deformed Bars versus Round Rods Anchored for Reinforced Concrete."

American Society of Civil Engineers.—At the meeting in the house of the Society, New York, December 1, a paper will be presented by James H. Brace and Francis Mason on "The New York Tunnel Extension of the Pennsylvania Railroad: The Crosstown Tunnels."

New England Water Works Association.—The December meeting will be held at Hotel Brunswick, Copley Square, Boston, December 8, at 2 p. m. The following programme will be presented: "The Underlying Principles Governing Riparian Water Rights and Diversion Suits," Charles F. Choate, Jr., Esq., Boston, Mass. Report of Committee "To collect data relating to awards that have been made for damages resulting from the diversion of water; also to consider the practicability of joint action with the National Cotton Manufacturers' Association or other organizations of mill owners, leading to the formulation of standard rules and methods of computing or assessing damages from the diversion of water," Charles T. Main, Boston, Mass.; Leonard Metcalf, Boston, Mass.; R. A. Hale, Lawrence, Mass.; Charles E. Chandler, Norwich, Conn.; William Wheeler, Boston, Mass., Committee. Members of the legal fraternity eminent in their profession have been invited to be present and participate in the discussion of Mr. Choate's paper and the report of the committee. Report of Committee "To gather statistics relating to the depth at which water pipes are laid, and the resulting experience with frozen pipes," Frank A. Barbour, Boston, Mass.; R. S. Lea, Montreal, Canada; W. C. Hawley, Wilkinsburg, Pa.; R. Winthrop Pratt, Columbus, O.; Emil Kuichling, New York City; W. C. Hoad, Lawrence, Kan.; Dabney H. Maury, Peoria, Ill., Committee. Robert J. Thomas, of Lowell, Mass., is President and Willard Kent, of Narragansett Pier, R. I., Secretary of the association.

Calendar of Meetings

Dec. 3-4.
New Jersey Sanitary Association.—Annual meeting, Lakewood, N. J.—J. A. Exton, Secretary, 75 Beach st., Arlington, N. J.

Dec. 7-10.
American Society of Mechanical Engineers.—Annual meeting, New York, N. Y.—C. M. Rice, Secretary, 29 W. 39th st., New York, N. Y.

Dec. 14-15.
Association of American Portland Cement Manufacturers—Annual meeting, New York, N. Y.—Percy H. Wilson, Secretary, Land Title Building, Philadelphia, Pa.

Dec. 6.
American Society of Refrigerating Engineers.—Annual meeting, New York, N. Y.—Wm. H. Ross, Secretary, 154 Nassau st., New York, N. Y.

Dec. 8-10.
American Institute of Chemical Engineers.—Annual meeting, Philadelphia, Pa.—J. C. Olsen, Secretary, Polytechnic Institute, Brooklyn, N. Y.

Dec. 14-16.
American Institute of Architects.—Annual convention, Washington, D. C.—Glenn Brown, Secretary, The Octagon, Washington, D. C.

Dec. 27.
American Association for the Advancement of Science.—Annual meeting, Boston, Mass. L. O. Howard, Secretary, Smithsonian Institute, Washington, D. C.

Jan. 6-8.
Montana Society of Engineers.—Annual meeting, Butte, Mont.—Clinton H. Moore, Secretary, Butte, Mont.

Jan. 12-14.
Michigan Engineering Society.—Annual meeting, Lansing, Mich.—Alba L. Holmes, Secretary, 574 Wealthy ave., Grand Rapids, Mich.

Jan. 14-16.
Indiana Engineering Society.—Annual convention, Indianapolis, Ind.—Chas. Brossman, Secretary, Union Trust Bldg., Indianapolis, Ind.

Feb. 21-25.
National Association of Cement Users.—Annual meeting, Chicago, Ill.—Geo. C. Wright, Secretary. Address all communications to Edw. E. Krause, Asst. to the President, Harrison Bldg., Philadelphia, Pa.

Feb. 24-26.
American Society of Engineering Contractors.—Annual convention, Chicago, Ill.—Daniel J. Hauer, Secretary, Park Row Building, New York, N. Y.

Jan. 25-27.
Canadian Society of Engineers.—Annual meeting, Ottawa, Ont.—C. H. McLeod, Secretary, 413 Dorchester st., West, Montreal, Quebec.

Jan. 26-28.
Illinois Society of Engineers and Surveyors.—Annual meeting, Cairo, Ill.—E. R. Tratman, Secretary, 1636 Monadnock Block, Chicago, Ill.

PERSONALS

ADRIAN, ROBERT, New Brunswick, N. J., formerly State Senator, has been elected City Attorney.

BALDWIN, C. C., Perth Amboy, N. J., Matthew Smith, R. Crouse and B. M. Gannon have been appointed members of a Harbor Board under an act of the Legislature approved last March. The Board has power to regulate the water front and channel, public docks and to acquire property by condemnation, subject to approval by Council.

BROWN, FRANK E., New York City, Engineer of the Electrical Bureau, removed by J. H. O'Brien, Commissioner of Water Supply, Gas and Electricity, has been reinstated by order of the State Supreme Court.

COOPER, STANLEY J., Columbus, Ind., has been named as Chief of Police by Mayor-Elect Charles S. Barnaby.

DELANY, JOHN J., New York, N. Y.; James D. Connor, Police Commissioner of Mount Vernon, and James P. Kilby have been appointed Water-shed Commissioners for land condemned for the Hill View reservoir near Yonkers, and the $10,000,000 filtration plant near Elmsford, Westchester County.

GERHART, LOUIS, Terre Haute, Ind., Mayor-elect, has made public the following list of appointments:
City Attorney, Peter M. Foley.
Board of Works, P. B. Walsh, Claude Bowers and W. A. Thornton.
Board of Safety, B. V. Marshall, George Burgett and Thomas H. Perkins.
City Controller, Levi P. Hughes.
City Engineer, Donn Roberts.
Fire Chief, John Tully.
Board of Health, Drs. Moorehead, Tabor and McAlister.
City Sanitarian, Dr. L. McIntosh.
Police Surgeon, Dr. W. S. Willien.
Building Inspector, Fred J. Maurer.
Clerk of Board of Works, O. W. Miller.
Clerk Board of Safety, W. D. Nicholson.
Deputy City Controller, Will Steeg.
Superintendent of Cemeteries, Thomas Callahan.
Street Commissioner, Harry Stokes.
Police Chief, John Kotsch.

HOUSE, CHARLES, Oneida, N. Y., has been appointed member of the Board of Public Works, in place of J. W. Warner, resigned. L. H. Johnson has been appointed Police and Fire Commissioner, succeeding F. C. Westfall, resigned.

HEAD, W. O., Louisville, Ky., recently elected Mayor, has announced the following appointments:
Board of Public Works—Chairman Caldwell Norton, Major W. A. Colston, John D. Wakefield.
Board of Public Safety—Chairman Edward J. Tierney, Rush C. Watkins, Pendleton Beckley.
Chief of Police—Maj. H. Watson Lindsey.
Night Chief of Police—Maj. Patrick Ridge.
Chief of Detectives—Capt. John Carney.
Chief of Fire Department—Capt. Ben Dillon.
Health Officer—Dr. Edward Grant. First Assistant, Dr. E. O. Witherspoon; Second Assistant, Dr. Griffin C. Kelly.
Superintendent of City Hospital—Dr. J. W. Fowler.
City Buyer—R. B. Green; Assistant, John Bean.
Wharfmaster—Frank Dugan.
Superintendent of Eruptive Hospital—Dr. Ira Whittenburg.
City Comptroller—Samuel M. Wilhite; Assistant, John Hancock.
Gas Inspector—John W. Vreeland.

JONES, HERBERT, Shelbyville, Ind., has been named by Mayor-elect Thomas Hawkins as City Attorney. W. T. Isley will be City Engineer. Dr. B. G. Keeney will be Secretary of the Board of Health.

KELLY, JOHN, New York, N. Y., blacksmith in the Department of Bridges, has had his salary increased from $15 to $25 a week. During the past year he saved two persons from drowning by diving after them, although he is sixty years old.

KEOGH, THOMAS H., New York, N. Y., Irving N. Tompkins, White Plains, and Samuel Strassberger, New York, have been appointed Water-shed Commissioners for land condemned for the filtration plant to be built near Elmsford, Westchester County.

MUELLER, JOHN, Georgetown, Wash., Mayor, has resigned as Chief of the Rainier Volunteer Fire Department, owing to a factional fight.

SPOONER, W. F., Valparaiso, Ind., Mayor-elect, recently gave three tons of candy to the school children of the city.

SULLIVAN, JOSEPH, Corona, L. I., N. Y., has been appointed by Borough President Gresser, Commissioner of Public Works of Queens, to succeed Commissioner Denton, who has been elected Municipal Justice.

TOWNSEND, DR. GILES E., Bowling Green, Ky., Mayor-elect, received the largest majority secured by any candidate for Mayor in the city for twenty-five years.

TURNER, HARRY C., Woodbridge, N. J., has been elected President of Woodbridge Fire Company, No. 1, and Howard R. Valentine, Chief.

WILLIAMS, CLARK, Albany, N. Y., has been appointed State Controller by Governor Hughes to succeed the late Chas. H. Gaus. Among other duties the Controller has charge of municipal accounting.

WILMARTH, MARK, Chelsea, Mass., formerly with the engineering staff of the War Department and also with the engineering staff of the sewer department of Boston, has been appointed a superintendent of construction of public buildings.

WOODRUFF, CLINTON ROGERS, Philadelphia, Pa., delivered an address November 8 on "Municipal Periodical Literature" at the H. Josephine Widener Branch of the Free Library of Philadelphia.

Civil Service Examinations

Superintendent of Streets—An examination will be held by the Civil Service Commission, Chicago, Ill., December 7, of applicants for the position of Superintendent of Streets at a salary of $5,000. There are no restrictions as to residence of applicants.

Water Supply Inspector—The Municipal Civil Service Commission, 299 Broadway, New York, will receive applications until Dec. 7, for the position of Inspector Board of Water Supply. The examination will be held Jan. 12, 1910, at 10 a. m. Knowledge of candidates respecting the construction of works for the storage and distribution of water will be considered.

Junior Engineer Draftsman—The United States Civil Service Commission announces an examination, January 5, 1910, to fill vacancies in the position of junior engineer draftsman, Engineer Department at Large, at salary ranging from $1,000 to $1,500. Application form 1312.

THE New York State Civil Service Commission, Albany, N. Y., will hold examinations, December 11, for the following positions:

Bridge designer, salary.....	$1,500 to $2,100
Bridge draftsman, salary...	1,200 to 1,500
Junior bridge draftsman, salary	900 to 1,200
Statistician, salary	1,800 to 2,400

Applications should be filed on or before December 4.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals

It is our purpose to give in the first issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article. Except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles, where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS

Road Improvement in California. Paper before American Road Makers' Association. By H. R. Postle. 1½ pp., Good Roads, November. 10 cts.

Road Building near San Diego, Cal. Using natural soils. Illustrated, ½ p., Engineering Contracting, November 3. 10 cts.

Progress in Road Building in Pennsylvania. Paper before American Road Builders' Association. By R. D. Beman, Deputy Highway Commissioner. 2 pp., Good Roads, November. 10 cts.

Progress Made in Road Building in Connecticut. Paper before American Road Makers' Association. By James H. Macdonald, State Highway Commissioner. 3½ pp., Good Roads, November. 10 cts.

Michigan's Road Problems. Paper before American Road Makers' Association. By F. F. Rogers, Deputy Highway Commissioner. 1 p., Good Roads, November. 10 cts.

Sheffield Highways, Sewerage and Tramways. Deputy City Surveyor's Report. 1½ pp., Surveyor, October 29. 20 cts.

Good Roads a National Issue. Paper before American Road Makers' Association. By N. J. Batchelder. 1½ pp., Good Roads, November. 10 cts.

Our Roads, Road Makers and Road Users. By W. H. Baxter. 1½ pp., Surveyor, October 29. 20 cts.

National Government as a Factor in Highway Development. Paper before American Road Makers' Association. By L. W. Page. 2½ pp., Good Roads, November. 10 cts; 2 pp., Contractor, November 15, 20 cts.

Modern Road Making. Paper before American Road Makers' Association. By W. W. Crosby, Chief Engineer, Maryland Geological Survey. 1 p., Contractor, November 1. 20 cts.; 1 p., Good Roads, November. 10 cts.

Road Surface, The. Paper before Ontario Land Surveyors. By W. A. McLean. 2 pp., Canadian Engineer, November 5. 15 cts.

Road to Mount Rainier. By M. O. Eldridge. Illustrated, 5 pp., Good Roads, November. 10 cts.

Macadam Roads, Methods and Costs of Constructing Chert. By E. B. Kay. Illustrated, 1 p., Engineering-Contracting, November 3. 10 cts.

Flint Roads, Its Qualities as a "Puncture Mixture." 2-3 p., Contract Journal, October, 20. 20 cts.

Automobiles, Tests of the Effect of, on Roads at Glen Ridge, N. J. 1-3 p., Engineering Record, November 20. 10 cts.

Public Health Aspect of the Road Question. Argument that roads rendered proof against the admission of surface moisture ought to have a favorable effect on the public health. By Arthur Gladwell. 3 pp., Journal Royal Institute of Public Health, November, 60 cts.

Oiling roads. Comparison made with scientific sprinkling with water. Discussion before American Society of Civil Engineers. By S. Whinery. 2-3 p., Municipal Journal and Engineer, November 3. 10 cts.

Oiling Telford Roads in East Orange, N. J. Paper before American Society of Municipal Improvements. By A. A. Reimer. ½ p., Engineering Contracting, November 17. 10 cts.

Binding. Specifications for the Analysis of Road. Communication from W. H. Clark defending the specifications of the Massachusetts Highway Commission. 1-3 p., Engineering News, November 11. 15 cts.

Review of the Methods Employed for the Preservation of Macadam Roads. 1 p., Engineering-Contracting, November 10. 10 cts.

Tar in the Surface Treatment of Roads. Paper before American Gas Institute. By H. J. Skinner. 4 pp., Municipal Engineering, November. 25 cts.

Asphalt Macadam Machine Mixing, Methods and cost of paving a county road connecting two cities with a pavement having a broken stone base and a stone and asphalt surface. Illustrated, 3½ pp., Municipal Journal and Engineer, November 17. 10 cts.

Recent Experience in Bituminous Road Construction in New York and Massachusetts. 2 pp., Engineering Record, November 20. 10 cts.

Bituminous Paving Cements. Factors in their valuation. Practically all bitumens can be used. Better inspection means more liberal specifications. Paper before American Society of Municipal Improvements. By L. Kirschbraun. 1 p., Municipal Journal and Engineer, November 24. 10 cts.

Asphaltic Specifications, Some Comments on. By H. Tipper. 1½ pp., Canadian Engineer, November 12. 15 cts.

Observations on Asphalt Paving and Some Present Needs. From paper before American Society of Municipal Improvements. By H. Tipper. 1½ pp., Engineering Contracting, November 17. 10 cts.

Control of Workmanship on Asphalt Pavement. Account of Chicago practice. By L. Kirschbraun. 3 pp., Municipal Engineering, November. 25 cts.

Brick, Quantities of Paving, and How to Estimate Them. From Bulletin No. 9. Illinois Geological Survey. By Prof. A. N. Talbot. 2½ pp. Contract Record, October 27. 10 cts.

Uniform Specifications in Brick Construction. Paper before American Road Makers' Association. By A. B. Lea. 1 p., Good Roads, November. 10 cts.

Pavements of Berlin. Construction, material and cost. Repairs and cleaning. By Consul General A. W. Thackera. 2 pp., Daily Consular Reports, October 22. 10 cts.

Methods and Costs of Constructing Pavements in Toronto. Paper before American Society of Municipal Improvements. By C. H. Rust, 3 pp., Engineering Contracting, November 17. 10 cts.

Paving and Roads. Reason for guarantee. State aid. Damage from low speed auto traffic. Cause and prevention of defects in asphalt pavements. 1½ pp., Municipal Journal and Engineer, November 24. 10 cts.

Some Paving Complications. Selecting the kind of pavement. Definition of asphalt. Specifications for bitumens. The maintenance problem. More complete records and investigation necessary. 2 pp., Municipal Journal and Engineer, November 17. 10 cts.

Closing Streets During Paving. Discussions by city officials of Washington, D. C. ½ p., Municipal Journal and Engineer, November 10. 10 cts.

Grade Limitations for Pavements in Bronx Borough, New York City. From paper before American Society of Municipal Improvements. By S. C. Thompson. 1 p., Engineering Contracting, Nov. 17. 10 cts.

Crowns for Roadways. Comment on paper by G. C. Warren. ¼ p., Municipal Journal and Engineer, November 17. 10 cts.

Roadway Crowns. Plea for simpler statements in place of formulæ. Discussion of different theories regarding crowns. By G. C. Warren. Illustrated, 1½ pp., Municipal Journal and Engineer, November 17. 10 cts.

Crowns and Concrete Foundations for Pavements. Paper before American Society of Municipal Improvements. By G. C. Warren. Illustrated, 1 p., Engineering Record, November 13, 10 cts.; 2 pp., Engineering-Contracting, November 10, 10 cts.

Street Design, Some Examples of. Illustrated, 2 pp., Municipal Engineering, November. 25 cts.

Sidewalks, Curbs and Gutters, Cement. Methods employed in Poughkeepsie, N. Y. Illustrated, 3 pp., Cement World, November. 15 cts.

Manufacture of Artificial Flags by Local Authorities. Comparative reports of general practice. 2 pp., Surveyor, October 29. 20 cts.

Street Trees, Providing for in Laying Out New Streets. From paper before American Society of Municipal Improvements. By Wm. Solotaroff. 1-3 p., Engineering-Contracting, November 17. 10 cts.

SEWERAGE AND SANITATION

Sewer, Cardiff, Western District, Main Outfall. Detailed description. Paper before Association of Municipal and County Engineers. By Wm. Harpur. Illustrated, 2 pp., Contract Journal, October 20. 20 cts. Illustrated, 4½ pp., Surveyor, October 22. 20 cts.

Sizes, Materials and Shapes of Sewers in the city of Hamilton. Paper before Ontario Land Surveyors. Illustrated, 2 pp., Canadian Engineer, Oct. 29. 15 cts.

Sewer Construction in Stapleton, Staten Island. General review and some construction details. Illustrated, 1 p., Engineering Record, October 30. 10 cts.

Sheffield's Sewage Works Extension. Completion of first section of two million dollar scheme. Illustrated, 8 pp., Surveyor, November 5. 20 cts.

Calumet Drainage Channel of the Chicago Sanitary District. Abstract of report by G. M. Wisner. Illustrated, 2 pp., Engineering News, November 18. 15 cts.

Concrete Sewer, Constructing and Lining a Stone Culvert with Concrete, using Collapsible Steel Centers. Illustrated, ¾ p., Engineering-Contracting, November 10. 10 cts.

Concrete Pipe and Storm Drain, Molded, Newark, N. J. Detailed description. Illustrated, 1 p., Engineering Record, Nov. 6. 10 cts.

Methods Employed in Constructing Concrete Sewer Pipe in Jackson, Mich. Illustrated, ¾ p., Engineering-Contracting, November 10. 10 cts.

Structural Details and Notes on Construction of Reinforced Concrete Pipe Sewer at Waukegan, Ill. Illustrated, 1 p., Engineering-Contracting, November 3. 10 cts.

A Concrete and Steel Storm Water Sewer and Some Remarks on Specifications and Designs. 2 pp., Engineering-Contracting, November 3. 10 cts.

Costs of Concrete and Brick Sewers in Hamilton, Ont. From paper before Ontario Land Surveyors. By E. G. Barrow. ¼ p., Engineering-Contracting, November 10. 10 cts.

Sewer Pipe Material. Comparative advantages of clay pipe and concrete. ½ p., Municipal Journal and Engineer, November 10. 10 cts.

Sewer Pipe Questions will be Investigated by American Society for Testing Materials. 1¼ pp., Concrete, November. 15 cts.

Tests on the Comparative Resistance to Wear of Different Materials for Sewer Inverts. From paper before American Society of Municipal Improvements. By E. S. Rankin. ½ p., Engineering-Contracting, November 17. 10 cts.

Bearing Power of Soils for Sewer Construction, Suggested Construction for Three Classes of Roads and Test for Determining the. From Journal of Association of Engineering Societies. By L. F. Pastone, 1 p., Engineering-Contracting, November 3. 10 cts.

Records of Cost and Progress on Sewer Contracts. Systematic Methods of Louisville Sewerage Commission. Illustrated, 2 pp., Contract Record, November 3. 10 cts.

Report Blanks Used in Connection with Louisville, Ky., Sewer System. Illustrated, 1 p., Engineering-Contracting, November 17. 10 cts.

How a City Paid One-third Excess Cost for "Cost-Plus-a-Percentage" Contract Work and yet Found it Cheaper than Day Labor. Sewer Construction, Boston. 2 pp., Engineering-Cotracting, November 17. 10 cts.

Capacity of Storm Water Sewers. Whether for ordinary or maximum rainfall rates. Methods, formulæ and data used in calculating in Greater New York. Illustrated, 2¾ pp., Municipal Journal and Engineer, November 10. 10 cts.

Storm Drainage, Methods of Providing for, at Street Intersections with some Costs of Catch Basin Construction. Paper before American Society of Municipal Improvements. By J. H. Weatherford. 1 p.,

Engineering-Contracting, November 17. 10 cts.

Sewage Pumping Plant at Baltimore. Illustrated, 1 p., Engineering Record, October 30. 10 cts.

Pollution of Rivers. Information regarding the manner in which German rivers are guarded from pollution by pulp factories. 1-3 p., Municipal Journal and Engineer, November 17. 10 cts.

State Control of the Pollution of Inter-State Streams. 4 pp., Quarterly Bulletin, Ohio State Board of Health, September. 25 cts.

Sanitary Condition of the Merrimac River and Observations on Stream Pollution in General. Comment on report of the Massachusetts State Board of Health. 1-3 p., Engineering News, November 11. 15 cts.

Pollution of the Merrimac River. Report of X. H. Goodnough to the Massachusetts State Board of Health. 3 pp., Engineering News, November 11. 15 cts.

House Drainage and Sewage Disposal. Comment on recent papers. 2-3 p., Contract Journal, November 10. 20 cts.

Sewage Disposal Experiments. Comment on Experiments being conducted at Philadelphia. ¼ p., Municipal Journal and Engineer, November 3. 10 cts.

Philadelphia Experiments in Sewage Disposal. Disinfection, contact and slate beds, Emscher tanks, sludge digestion, sprinkling filter and sludge disposal. Illustrated, 4 pp., Municipal Journal and Engineer, November 3. 10 cts.

Baltimore Sewage Purification Plant. Detailed description of construction. Illustrated, 3½ pp., Municipal Journal and Engineer, November 24. 10 cts.

Baltimore Sewage Disposal Work. Contractor's plant and construction details. Illustrated, 2 pp., Engineering Record, November 13. 10 cts.

Construction Details of the Baltimore Sewage Disposal Works. 3 pp., Engineering Record, November 20. 10 cts.

Barnsley, Sewage Purification at. Report to Corporation. By J. Henry Taylor. 1½ pp., Surveyor, October 22. 20 cts.

Sheffield, Sewage Disposal at. Bacterial treatment in course of substitution for precipitation. How savings on capital outlay have been secured. Illustrated, 2 pp., Municipal Journal, November 5. 15 cts.

India. Sewage Disposal in. Bacterial Treatment. Discussion of system suited to India. 4 pp., Indian Public Health, October. 25 cts.

Chemistry and Bacteriology of Sewage Purification. Paper before Society of Engineers. By Dr. David Somerville. 1 p., Contract Journal, November 10. 20 cts.

Separation of Solids from Sewage and Waste Liquors. Notes on. Paper before Association of Municipal and County Engineers. By J. P. Norrington. Illustrated, 3 pp., Canadian Engineer, November 12. 15 cts.

Wastes from a Dairy Industry, Disposal of. By A. E. Kimberly. 20 pp., Quarterly Bulletin, Ohio State Board of Health, September. 25 cts.

Water Supply and Sewage Disposal in Germany. Comment on a discussion on the disposal of trade effluents. By Dr. Albert Schield. 1 p., Water, Oct. 15. 20 cts.

Septic Tanks in the Biological Purification of Sewage, Action of. Comment on recent papers in the Comptes Rendus. 2 pp., Water, October 15. 20 cts.

Dibdin Slate Beds. Discussed by Mr. Dibdin himself. Really contact beds but easily cleaned. Effluent not offensive. Illustrated, 1 p., Municipal Journal and Engineer, November 10. 10 cts.

Theory and Practice in the use of the Dibdin Slate Beds for Sewage Disposal. Abstract of paper before Institution of Sanitary Engineers. Illustrated, 3 pp., Engineering-Contracting, November 3. 10 cts.

Experience with Slate Beds in Sewage Disposal. From paper before Institute of Sanitary Engineers. By W. J. Dibdin. 2 pp., Engineering Record, November 6. 10 cts.

Percolating Filters, Aerial Distribution of Sewage Over. Account of experience at Waterbury, Conn. By W. G. Taylor. Illustrated, 7 pp., Engineering News, November 11. 15 cts.

Typhoid Fever in Ohio, with Some Observations on Outbreaks at Various Places. By H. M. Platter. 6 pp., Quarterly Bulletin, Ohio State Board of Health, September. 25 cts.

Is Typhoid to be Conquered at Last? Statement of the discovery of anti-typhoid vaccine. By James Creelman. Illustrated, 17 pp., Pearsons, December. 15 cts.

Sewer Air, Bacteria In. From report by Prof. C. E. A. Winslow to the National Association of Master Plumbers. 5 pp., Indian Public Health, October. 25 cts.

Milk in the Home, Care of. By Dr. E. C. Levy, Chief Health Officer, Richmond, Va. 1 p., Bulletin Indiana State Board of Health, August. 10 cts.

Pure Milk for Cities. Efforts being made by the English city of Birmingham. By Consul Albert Halstead. 1 p., Daily Consular Reports, November 3. 10 cts.

Impracticability of Examining Milk or Water for the Typhoid Bacillus. By B. R. Rickards. 3 pp., Quarterly Bulletin, Ohio State Board of Health, September. 25 cts.

Consumption from Street Dust. Conclusions from investigations described in Bulletin 82, Bureau of Labor. ¼ p., Municipal Journal and Engineer, November 10. 10 cts.

The Control and Prevention of Tuberculosis. By Dr. John Robertson, Medical Officer of Health, Birmingham, Eng. 7 pp., Journal Royal Institute of Public Health, November. 60 cts.

Tuberculin Tests at Chicago. ¼ p., Municipal Journal and Engineer, November 3. 10 cts.

Hospital Work at Bury. Sanitarium for the treatment of consumptive cases. Illustrated, 2 pp., Municipal Journal, October 22. 15 cts.

State Board of Health in its Official Relations to Sanitary Engineers. Paper before Ohio Engineering Society. By C. O. Probst. 4 pp., Quarterly Bulletin, Ohio State Board of Health, September. 25 cts. 1 p., Canadian Engineer, November 5. 15 cts.

Infant Depots in Sheffield. Account of results obtained. By Dr. A. E. Naish. 7 pp., Journal Royal Institute of Public Health, November. 60 cts.

Sanitation at Gravesend. Report to the Local Government Board by Dr. J. R. Reece. 2 pp., Water, October 15. 20 cts.

Better Sanitation in Indiana. Reports received by the State Board from local officers. 1-3 p., Municipal Journal and Engineer, November 24. 10 cts.

The Sanitation of Rotterdam. Measures taken to suppress an outbreak of cholera. By R. A. C. Wollenberg. 3 pp., Public Health Report, October 22. 10 cts.

Oriental Sanitary Engineering. Paper before Sanitary Institute. By C. T. Evennette. 1 p., Contract Journal, November 10. 20 cts.

The City of Agen, Its Sanitary and Hygienic Condition. By Augustin Ray. 10 pp., La Technique Sanitaire, October. 50 cts.

Municipal Hygiene. Living quarters of domestic servants. By Henry Thierry and Lucien Graux. 6 pp., La Technique Sanitaire, October. 50 cts.

Municipal Abattoirs. 1 p., Western Municipal News, November. 10 cts.

WATER SUPPLY

Water Supply System of Newton, Mass. Details of Recent Extension. Illustrated, 1½ pp., Engineering Record, November 20. 10 cts.

Bangkok's Water Supply. Some details of new system. 1 p., Indian Public Health, October. 25 cts.

Haslingden Water Supply. Description of works. Illustrated, 4 pp., Surveyor, November 5. 20 cts.

Glasgow Water Jubilee. City celebration of the semi-centennial of the inauguration of the city water supply from Loch Kathrine. Illustrated, 2 pp., Municipal Journal, October 22. 15 cts.

Guelph Water Works. General description. A. W. Campbell. 2 pp., Municipal World, November. 15 cts.

Combined Water Supply, Irrigation and Power Project. Plan, construction and purposes of the Los Angeles aqueduct. By B. A. Heinly. Illustrated, 14 pp., Engineering Magazine, November. 25 cts.

Water Distribution, Public. Relative advantages of the ring system and the central main system of public water distribution. By Rudolph Hering. Illustrated, 5 pp., Insurance Engineering, October. 25 cts.

Depth of Laying Water Pipe. Extracts from report to New England Water Works Association. 2-r p., Engineering Record, November 13. 10 cts.

Concrete Pipe for Flow Lines. Comment on recent extension of their use. ½ p., Engineering Record, November 6, 10 cts.

Twelve-Mile Concrete Conduit. Description of a 36-inch concrete pipe used for power development at Little Boulder Creek, Col. Illustrated, 2 1-3 pp., Engineering Record, November 6. 10 cts.

Tunnel Costs. Some Detail of the Los Angeles Aqueduct. By C. H. Richards. Illustrated, 1½ pp., Engineering News, November 18. 15 cts.

Waterproofing a Shaft of the Blue Island Avenue Water Tunnel, Chicago. Detailed description. Illustrated, 1 2-3 pp., Engineering News, November 11. 15 cts.

Aqueduct. Los Angeles, Causes of low cost and rapidity of construction. By B. A. Heinly. Illustrated, 7 pp., Municipal Engineering, November. 25 cts.

Tank Cars, Municipal Water Furnished by, Experience at Denison, Tex. ¼ p., Municipal Journal and Engineer, November 10. 10 cts.

Sprinkler Hydrants. Use of Crane Hydrants in Springfield, Mass. ¼ p., Municipal Journal and Engineer, November 17. 10 cts.

Underground Water in Crystaline Rocks. Evidence of water in a class of rock strata in which it does not ordinarily exist. By F. G. Clapp. Illustrated, 3 pp., Engineering Record, November 6. 10 cts.

Infiltration Well at Coshocton. Paper before Central States Water Works Association. By A. M. Fisher. ½ p., Fire and Water, October 27. 10 cts.

The Interference of Wells. Evidence that all parts of a water-bearing bed bear a definite relation to all other parts, and that in sinking wells attention should be paid to the effect on others. By F. G. Clapp. Illustrated, 2 pp., Engineering News, November 4. 10 cts.

Pumping, New Idea in Deep Well. Account of successful and economical method employed in Memphis, Tenn. ½ p., Municipal Journal and Engineer, November 24. 10 cts.

Development of Centrifugal Pumps. Paper before Central Water Works Association. By J. D. Berg. Illustrated, 1½ pp., Engineering News, November 11. 15 cts.

A 24,000,000-Gallon Pumping Plant of the People's Water Company. By C. C. De Wolf. Illustrated, 4 pp., California Journal of Technology, November. 15 cts.

Torresdale Pumping Plant and Filters. Low head centrifugal pumping station with capacity of 280 million gallons in 24 hours and largest filtering plant of its kind in the world. By Thos. Wilson. Illustrated, 6 pp., Power, November 16. 5 cts.

Water Tower at Gary, Ind., Ornamental. Encloses steel tank and tower more than 100 feet high. Illustrated. 2-3 p., Municipal Journal and Engineer, November 3. 10 cts.

Concrete Water Tower in Brussels, Belgium. By H. P. Kieffer. Illustrated, 4 pp., Cement Age, November. 15 cts.

Dam at Fergus Falls, Minn., Failure of the. Communication from R. S. Fuertado. 1 p., Engineering News, November 4. 10 cts.

Standley Lake Dam, near Denver, Col. Construction details. Illustrated, 4 pp., Engineering Record, November 13. 10 cts.

Reservoir, Scout Moor High Level, Haslingdon Water Supply. Illustrated, 1½ pp., Contract Journal, November 10. 20 cts.

Suggestions from a Water Works Engineer. Paper before Central States Water Works Association. By A. L. Holmes. 1 p., Fire and Water, October 27. 10 cts. 1 1-3 pp., Water and Gas Review, October. 20 cts.

Meters, Reading Water. Communication from Dow R. Gwinn, describing the practice of the Terre Haute Water Works Company, ½ p., Municipal Journal and Engineer, November 17. 10 cts.

Finances, Water Works. Estimate of the value of free water supplied to departments in Springfield, Mass. ¼ p., Municipal Journal and Engineer, November 24. 10 cts.

Water Works Finances of Colorado Springs. The question of free water. 1-3 p., Municipal Journal and Engineer, November 10. 10 cts.

A Business Basis for Attleborough. Statement of Water Commissioners as to the difficulties of conducting business on a scientific basis. ¼ p., Municipal Journal and Engineer, November 10. 10 cts.

Depreciation Reserve. Paper before New England Water Works Association. By Harvey S. Chase. 1 p., Municipal Journal and Engineer, November 24. 10 cts.

Filtration, Indianapolis Water. Coagulation followed by sedimentation. Alum and Lime-Iron processes compared. Results and costs. Illustrated, 2 pp., Municipal Journal and Engineer, November 3. 10 cts.

Bernhart Sand Filters. Account of conditions and improvements to the Reading, Pa., water supply. Illustrated, 2½ pp., Engineering Record, November 13. 10 cts.

Work of the Ludlow Filter. Cost and efficiency of operating filters at Springfield, Mass. ¼ p., Municipal Journal and Engineer, November 24. 10 cts.

New Filtration Plant for Wilkinsburg. Paper before Central States Water Works Association. By F. B. Leopold. 2 pp., Canadian Engineer, November 5. 15 cts.

Filtration and Purification of Water for Public Supply. The Jewel and other filters. Paper before Institution of Mechanical Engineers. By John Don. 9 pp., Indian Public Health, October. 25 cts. Abstract of same, 2 2-3 pp., Fire and Water, November 3. 10 cts.

New Filtration Works and Pumping Stations of Philadelphia. General description. Illustrated, 1½ pp., Fire and Water, November 3. 10 cts.

The Red Water Plague. Comment on the causes of a source of trouble in filtered

water. ½ p., Engineering Record, November 13. 10 cts.

Water Purification at Wilmington, Del. General Account and some construction details. Illustrated, 3 pp., Engineering Record, November 20. 10 cts. Illustrated, 2 pp., Municipal Journal and Engineer, November 10. 10 cts.

STREET LIGHTING AND ELECTRIC POWER

Street Lighting Abroad. By H. Thurston Owens. Illustrated, 3 pp., Electrical Review, November 13. 10 cts.

Installation of Display Street Lighting with Gas at Portland, Ore. By V. L. Scott. Illustrated, 2 pp., Illuminating Engineer, November. 20 cts. Illustrated, 1 p., Gas Light Journal, November 15. 10 cts.

Illuminating Features of the Hudson Fulton Celebration. Illustrated, 7 pp., Illuminating Engineer, November. 20 cts.

Tungstens Displace Gasoline Lamps in New York City Parks. Illustrated, ½ p., Electrical World, November 18. 10 cts.

Titanium Arc. Paper before American Electro-Chemical Society. By W. S. Weedon. 4 pp., General Electric Review, November. 20 cts.

Lamp Posts, Concrete. Illustrated, 3½ pp., Cement Age, November. 15 cts.

Rates for Municipalities, Special Electric. Comment on recent ruling of the Massachusetts Gas and Electric Light Commission. ½ p., Engineering Record, November 6. 10 cts.

Rates for Tungsten Street Lamps. Lower rates for illumination and higher rates for energy. Figures from actual conditions. By Alton D. Adams. 1½ pp., Municipal Journal and Engineer, November 3. 10 cts.

Central Stations of Towns of 100,000 Inhabitants. By C. D. Haskins. Illustrated, 8 pp., General Electric Review, November. 20 cts.

Berlin System of Central Stations. By Frank Koester. Illustrated, 13 pp., Engineering Magazine, November. 25 cts.

Municipal Lighting and Pumping Plant at Grand Rapids, Mich. By P. C. Jameson. ½ p., Municipal Journal and Engineer, November 3. 10 cts.

Hypochlorite of Lime Treatment in Water Purification. Historical review of its use. 1 p., Engineering Record, November 20. 10 cts.

Suggestions on the Use of the Iron and Lime Process of Water Purification. Paper before Central States Water Works Association. By C. A. Brown. 2½ pp., Engineering News, November 18. 15 cts.

Ozone Treatment. Report by Toronto City Engineer to the Corporation. 2-3 p., Canadian Engineer, November 5. 15 cts.

Storage, Purification of Water By, at Manchester, N. H. ¼ p., Municipal Journal and Engineer, November 10. 10 cts.

Water Softening or Purification and its Saving. By H. Miller. 4½ pp., Chemical Engineer, October. 25 cts.

Interpretation of Chemical Water Analysis. Paper before Royal Institute of Berlin for the investigation of water supply and sewerage. By Dr. Hartwig Klut. Translated by E. A. Giesler. 2½ pp., Engineering Record, October 30. 10 cts.

New Bacteriological Standard for Water Analysis. From paper by Prof. T. A. Starkey. 1½ pp., Indian Public Health, October. 25 cts.

Conservation of Water. Paper before Joint Engineering Society of New York on the conservation of natural resources. By John R. Freeman, 4 pp., Water, October 15. 20 cts.

Selection of Water System, Putting Responsibility as to, on the Voters in El Paso, Tex. ½ p., Municipal Journal and Engineer, November 3. 10 cts.

Population, Consumers and lamps. Analysis of their relation in a Metropolitan District. By Alton D. Adams. Illustrated, 1½ pp., Electrical World, November 4. 10 cts.

Gas Plant, Municipal Experiences. Paper before California Gas Association. By C. E. Moore. Illustrated, 2 pp., Municipal Engineer, November. 25 cts.

Electrolysis, Damage by. What European cities do to prevent losses. Answers to questions submitted to American consuls. By E. N. Lake, Chairman of the Electrolysis Committee of Chicago. 2 pp., Daily Consular Reports, November 11. 10 cts.

Recent Views on Remedies of Electrolysis, 1-3 p., Engineering Record, November 20. 10 cts.

Protection of Underground Pipes from Electrolysis. Paper before American Gas Institute. By A. F. Ganz, 2-3 p., Engineering Record, November 20. 10 cts.

Water Power Developments, Public Benefits Derived from. Paper before Pacific Coast Gas Association. By John Martin, 4½ pp., Public Service, November. 20 cts.

FIRE AND POLICE

Fire Hazard at Peoria. Report of the National Board of Fire Underwriters. ½ p., Fireman's Herald, October 30. 5 cts.

Hotel Fires. Precautions to avoid. 2-3 p., Fireman's Herald, October 13, 5 cts.

Fire Precautions for the General Public. Paper before Massachusetts Firemen's Association. By Capt. Greely S. Curtis. 1 p., Fire and Water, November 3. 10 cts.

Fire Boat Service of Detroit. Illustrated, ½ p., Fire and Water, October 27. 10 cts.

Pumps, High-Pressure Fire Service, in New York City. Abstract of a paper before American Society of Mechanical Engineers. By Prof. R. C. Carpenter. 2 pp., Power, November 2. 5 cts.

How to Test Engines to Ascertain Their Condition for Highest Efficiency According to their respective rating. Paper before International Association of Fire Engineers. By Thos. O'Connor, Chief Engineer, Fire Department, New Orleans. 1 2-3 pp., Fire and Water, October 27. 10 cts.

Fire Station, Portslade-by-Sea, New. Illustrated, 1 p., Surveyor, October 29. 20 cts.

Finger Print Identification. Extent of the use of the system. ½ p., Municipal Journal and Engineer, November 10. 10 cts.

GOVERNMENT AND FINANCE

Commission Rule for Spokane. Views of Mayor N. S. Pratt as to the causes of the inefficiency of the present system. ½ p., Municipal Journal and Engineer, November 10. 10 cts.

Municipal Government by Commission. By W. J. Bell. 1 p., Municipal World, November. 15 cts.

Government by Commission Plan. Paper before League of California Municipalities. By A. E. Dodson. 7 pp., Pacific Municipalities, October. 10 cts.

Charter, General Features of the Berkeley. By B. L. Hodghead. Paper before League of California Municipalities. 6 pp., Pacific Municipalities, October. 10 cts.

Public Service Problems. Paper before Michigan Gas Association. By James T. Lynn. 2½ pp., Public Service, November. 20 cts.

Regulation of Public Utilities. Address before Wisconsin State Bar Association. By John H. Romer, Member Railroad Commission of Wisconsin. 2½ pp., Public Service, November. 20 cts.

Taxation of Public Service Companies. Paper before International Tax Association. By W. H. Garden. 1½ pp., Public Service, November. 20 cts.

Assessment and Taxation of Railway. Account of Canadian Practice. 1½ pp., Municipal World, November. 15 cts.

Rates for Public Service, Equitable. By Dugal C. Jackson. 4 pp., Public Service, November. 20 cts.

Organization. How to Effect and Maintain it. By A. C. Davidson. 1½ pp., Contractor, November 15. 20 cts.

Uniform Municipal Accounting. Paper before Union of Saskatchewan Municipalities. By J. N. Bayne. 2 pp., Western Municipal News, November. 10 cts.

Plea for Scientific Accounting. Correct accounting a fundamental basis for regulation and taxation. Paper before American Association of Public Accountants. By Allen Ripley Foote. 1½ pp., Public Service, November. 20 cts.

Bond Sales, Municipal, during October. 1½ pp., Municipal Journal and Engineer, November 17. 10 cts.

TRAFFIC AND TRANSPORTATION

Grade Crossing Elimination, in Worcester, Mass. Account of elevation of four miles of railroad requiring regrading of 15 streets. Illustrated, 2 pp., Engineering Record, October 30. 10 cts.

Track Construction and Paving, Street Railway. Use of T-rails in paved streets. Report to American Street and Interurban Railway Association. Illustrated, 2½ pp., Engineering News, November 11. 15 cts.

Trackless Trolley Car Around London, First. Illustrated, Electrical Review, October 30. 10 cts.

Parked Street Railways in German Cities. General account. Illustrated, 1¼ pp., Electric Railway Journal, October 30. 10 cts.

Street Railway System of Bombay, India. General description. Illustrated, 2½ pp., Electric Railway Journal, November 6. 10 cts.

Interurban Electric Railways. General discussion. Rights of way and track construction. By Benj. Franklin. Illustrated, 20 pp., Proceedings Engineers' Club of Philadelphia, July. 20 cts.

Interurban Railway Situation in Massachusetts. Projects before Massachusetts Railway Commission. 1 p., Electrical Review, November 13. 10 cts.

Underground Railways in London. General account. By C. O. Burge. Illustrated, 2 pp., Engineering Record, November 20. 10 cts.

Elevated Railway Construction, Concrete Forms for. Methods used in constructing Forest Hill extension, Boston Elevated Railway. Illustrated, 1 2-3 pp., Engineering Record, November 13. 10 cts.

Arborway Section of the Boston Elevated Railway. Detailed description of ornamental steel and concrete structure. Illustrated, 3 pp., Engineering Record, November 6. 10 cts.

Chicago Traction, First Annual Report of Board of Supervising Engineers. By B. J. Arnold, Chairman. 3 pp., Electric Railway Journal, November 13. 10 cts.

Publicity for Electric Railways. Paper before Central Electric Railway Association. By A. D. B. Van Zandt. 1½ pp., Electric Railway Journal, November 20. 10 cts.

Cleveland, Traction Peace in. Principal Obstacles to Reorganization Overcome. 2½ pp., Public Service, November. 20 cts.

STRUCTURAL MATERIALS

Cement Inspectors' Laboratory, Washington. Detailed description. By Guy A. Ourand. 2½ pp., Cement World, November. 15 cts.

Use of Cement in Municipal Work. Comments on recent increase. ½ p., Municipal Journal and Engineer, November 24. 10 cts.

Slow Setting and Rapid Hardening. Portland cement. Communication from Albert Moyer. ¾ p., Engineering Record, November 13. 10 cts.

Rate of Increase in Strength of Cement. Abstract of report by Clifford Richardson. 1½ pp., Engineering Record, October 30. 10 cts.

Concrete, Compressive Strength of Coke. Account of experiments at Cornell University. By J. M. Lewis, 1 p., Engineering Record, October 30. 10 cts.

Conservation of Plane Section in Concrete Beams. Account of experiments undertaken at Cornell University. By R. P. Davis. Illustrated. 2½ pp., Engineering Record, November 6. 10 cts.

Preparation of Shingle for Concrete. Description of Plant on Thames River. Illustrated, 1½ pp., Contract Journal, November 3. 20 cts.

Design and Construction of Forms for Concrete Work. Illustrated, 1½ pp., Engineering-Contracting, November 3; Illustrated, 2 pp., November 10; Illustrated, 1 p., November 17. 10 cts.

Reinforced Concrete Beams, Deflection of. Technical discussion. 1½ pp., Engineering-Contracting, November 10. 10 cts.

Stresses in Reinforced Concrete Beams. A comparison of experimental results with results obtained from the use of three theories of the distribution of stresses. Paper before American Society of Mechanical Engineers. By Professor Gaetano Lanza and L. S. Smith. 2½ pp., Engineering-Contracting, November 10. 10 cts.

Grouting, Some French Methods and Machines for. 1 p., Engineering Record, October 30. 10 cts.

Raw Materials, Selective Economy in. Paper before American Chemical Society. By H. S. Mork. 3 pp., Canadian Engineer, October 29.

Theory of Impact and Its Application to Testing Materials. Illustrated, 49 pp., Journal of the Franklin Institute, November. 50 cts.

BRIDGES

St. Louis Municipal Bridge, The River Spans of the. Illustrated, 2 pp., Engineering Record, Oct. 30. 10 cts.

Municipal Bridge at St. Louis. Comment on the general design. 2-3 p., Engineering Record, Oct. 30. 10 cts.

Elizabethtown, O., Highway Bridge over the Miami River at. The longest simple truss span bridge in existence. By H. C. Tyrrell. Illustrated, 1½ pp., Canadian Engineer, Nov. 5. 15 cts.

Queensboro Bridge, Architectural Details of the. Illustrated, 10 pp., Architects' and Builders' Magazine, October. 20 cts.

Copenhagen, Denmark, Artistic Bascule Bridge at. Illustrated, 2 pp., Municipal Engineering, November. 25 cts.

Pasadena, Cal., Linda Vista Viaduct at. Illustrated, 1 1-3 pp., Engineering Record, Nov. 20. 10 cts. 1½ pp., Engineering News, Nov. 18. 15 cts.

Cedar Rapids, Ia., Method of Constructing a Concrete Bridge. 2½ pp., Contractor, Nov. 15. 20 cts.

Abutment, Removing and Rebuilding a Bridge. Account of Experience at Hartford, Conn. By Paul Sheldon. Illustrated, 2-3 p., Engineering Record, Nov. 6. 10 cts.

Track Elevation Bridges in Chicago, Special. Illustrated, 1½ pp., Engineering Record, Nov. 13. 10 cts.

MISCELLANEOUS

Garbage Disposal. Report to Board of Contract and Supply, Albany, N. Y. By Commissioner Wallace Greenlach. 4 pp., Albany Citizen, November. 10 cts.

Town Scavenging and Refuse Disposal. Account of conditions in England. By H. S. Watson. 2 pp., Municipal Engineering, November. 25 cts.

Refuse Destructor at Farnsworth. Installation of a Heenan and Froude Incinerator. Illustrated, ½ p., Municipal Journal and Engineer, Nov. 3. 10 cts.

Southgate Refuse Destructor. A four-cell incinerator, built by Manlove, Alliott and Co. Illustrated, 1-3 p., Municipal Journal and Engineer, Nov. 3. 10 cts.

Municipal Theatre, Denver Inaugurates. Illustrated, 3 pp., Denver, Municipal Facts, Nov. 6. 10 cts.

Municipal Building, Mechanical Equipment of the, Washington, D. C. Detailed description. Illustrated, 3 pp., Engineering Record, Oct. 30. 10 cts.

Gymnasiums and Baths, How Public, Help to Make Good Citizens. By E. B. Mero. Illustrated, 8 pp., American City, October. 10 cts.

Playgrounds. Why Teach a Child to Play? By Geo. E. Johnson. 11 pp., Proceedings Third Annual Congress of the Playground Association of America. November. 15 cts.

Charities and Correction, Our Dreams of. Ideals of the Cleveland Department. By H. R. Cooley. 1 p., The Townsman, Oct. 23. 10 cts.

Libraries, Municipal Legislative Reference. Paper before American Library Association. By S. H. Ranck. 2-3 p., Engineering News, Nov. 4. 10 cts.

Dock Scheme, The St. Just, Falmouth Harbor. Account of a 3,000 ft. landing pier. Illustrated, 2 pp., Water, Oct. 15. 20 cts.

Chelsea Municipal Docks, N. Y. General account and some construction details of a system of nine docks built at the cost of ten million dollars. Illustrated, 7 pp., Municipal Journal and Engineer, Nov. 3. 10 cts.

Flood Controlling Works, Paxton Creek, Harrisburg, Pa. Detailed description. By R. M. Riegel. 12 pp., Cornell Civil Engineer, October. 20 cts.

Plan of Chicago. Popular account. By C. H. Wacker. Illustrated, 6 pp., American City, October. 10 cts.

Technical Features of the Plan of Chicago. By C. H. Wacker and E. H. Bennett. Illustrated, 5 pp., American City, October. 10 cts.

Is Your City Beautiful? Paper before National Convention of Real Estate Exchanges. By R. B. Watrous. 1 p., Real Estate News, November. 25 cts.

Excavation with Fresno Scrapers, Low Cost of. By W. N. Frickstad. 1½ pp., Engineering-Contracting, Nov. 3. 10 cts.

Cost of Hauling by Two Methods Compared. Performance of dump wagons drawn by traction engine as compared with ordinary two-horse wagons. Illustrated, 3½ pp., Contractor, Nov. 1. 20 cts.

Day Labor System in Baltimore. Query as to its economy. 1 p., Engineering-Contracting, Nov. 17. 10 cts.

Inefficiency in Municipal Work, Cost of. By W. B. Snow. Illustrated, 6 pp., American City, October. 10 cts.

Report Blanks for Public Works in Municipalities. Blanks in use in Newton, Mass. 2 pp., Engineering - Contracting, Nov. 3. 10 cts.

Estimates, Proposed Uniform System of Preparing. Need for reliable basis of making up competitive bids. By W. M. Brown. 1 p., Contract Record, Nov. 17. 10 cts.

Sidewalks, Obstruction of. Legal power of city to regulate their use. ½ p., Municipal Journal and Engineer, Nov 17. 10 cts.

Municipal Reform. The Organized Criminals of New York. Those in or protected by the police force. By Theodore A. Bingham, Ex-Commissioner of Police. 5 pp., McClures, November. 15 cts.

Tammanyizing of a Civilization. Defiance of law and morals in New York, San Francisco and other cities. By S. S. McClure. 12 pp., McClure's, November. 15 cts.

The Beast and the Jungle. Third installment of story of personal experiences with the Denver "Machine." By Judge Ben B. Lindsey. Illustrated, 15 pp., Everybody's, December. 15 cts.

Obligation to Serve, Decision on. Abstract of case East Ohio Gas Company versus city of Akron before Supreme Court of Ohio. 1¾ pp., Progressive Age, Nov. 15. 20 cts.

Telephone Competition in Omaha. Independent company's unfortunate experience as related by itself. 1 p., Public Service, November. 20 cts.

Questions and Answers. Statement of the sort of information which it is possible for a technical journal to give to its correspondents. 1-3 p., Municipal Journal and Engineer, Nov. 17. 10 cts.

Engineers' Opportunities in Southern Appalachians. Paper before Appalachian Engineering Association. By R. H. Edmunds. 2 pp., Manufacturers' Record, Nov. 18. 15 cts.

Convention, Municipal Improvement. Account of scope of the American Society of Municipal Improvements, Municipal Journal and Engineer, Nov. 3. 10 cts.

Status of Engineers. Comment on G. A. Thomas' paper on the same subject. 1½ pp., Surveyor, Nov. 5. 20 cts.

Status of the Engineering Profession of Great Britain. From paper by G. A. Thomas before the Society of Engineers. 1 1-3 pp., Engineering Record, Oct. 30. 10 cts.

How to Improve the Status of Engineers and Engineering. With special reference to consulting engineers. By C. J. Yorath. 2½ pp., Surveyor, Oct. 22; 1½ pp., Oct. 29. 20 cts.

Curacao—A Little Paradise in the Dutch West Indies. Popular description. By Charles J. Post. Illustrated, 8½ pp., Century, December. 35 cts.

BOOK REVIEWS

Hendricks' Commercial Register of the United States for Buyers and Sellers.—Eighteenth annual edition. Samuel E. Hendricks, New York, 1909. Cloth, 8x10½, 1220 pages. Price $10.

This edition contains over 350,000 names and addresses of American manufacturers classified under 35,774 classifications representing about every machine, material, apparatus or specialty required in the architectural, engineering, mechanical, electrical, manufacturing, railway, mine quarrying and other kindred industries. The classification, besides including articles manufactured, covers occupations and contains lists of sanitary engineers and the like.

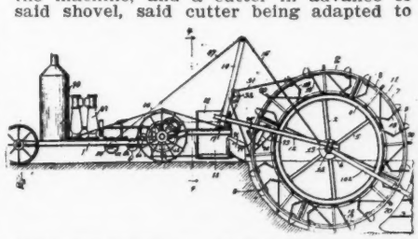
Reservoirs for Irrigation, Water Power and Domestic Water Supply. By James Dix Schuyler. 18mo, 556 pages. New York: John Wiley & Sons. Price, $6.00.

The first edition of this work appeared in 1901 and met with a very cordial reception, it being practically the only work devoted to a thorough presentation of the practice as well as the theory of dam design and construction. Since then there has been great activity in this class of work, largely because of the great developments in hydroelectric plants, and the second edition has been thought necessary to bring the work up to date and take account of these later developments. Consequently much new matter has been added and some of the old has been removed as obsolete. The chapter on hydraulic fill dams has been greatly extended by descriptions of later constructions. A new chapter describing reinforced concrete dams and another on structural steel dams have been added in this edition. On three plates are shown profiles of all the leading and better-known masonry dams in existence, drawn to uniform scale for easy graphical comparison. The book is profusely illustrated, a considerable percentage of the 381 figures being photographs of dams either completed or under construction. In addition to materials and methods of construction, the cost of reservoirs is given where obtainable.

PATENT CLAIMS

939,598. MACHINE FOR DIGGING DITCHES. Edward Jeschke, Bellevue, Ohio, assignor to The Jeschke Manufacturing Company, Bellevue, Ohio, a Corporation of Ohio. Serial No. 469,132.

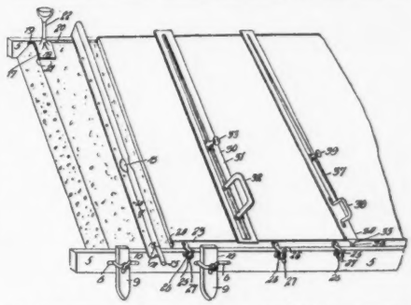
In a machine of the character described, the combination of a running gear, a shovel, means adapted to receive material from said shovel and discharge the same from the machine, and a cutter in advance of said shovel, said cutter being adapted to



sever the layer of material taken by said shovel angularly with respect to a horizontal plane, whereby such layer may be laterally compressed, substantially as described.

939,071. APPARATUS AND PROCESS OF LAYING CEMENT SIDEWALKS OR SIMILAR STRUCTURES. Alexander D. Ney, Aurora, Ill. Serial No. 479,545.

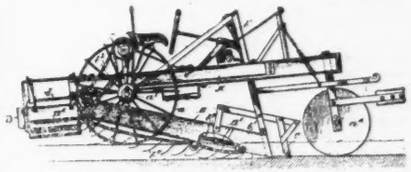
The process of laying a cement structure, which consists in securing lower rails in the desired position, pouring in a foundation layer of material between the rails and up to the level of the upper edges of the rails, leveling the surface of such material by means of a straight edge resting upon the lower rails, then securing to the lower



rails upper strips having a projection above the lower rails equal to the intended thickness of the surface layer, and then pouring in a surface layer of cement and leveling such layer by means of an implement resting upon the upper strips, substantially as described.

939,665. ROAD-SCRAPER. Cyrus H. Casner, Williamsport, Pa. Serial No. 433,726.

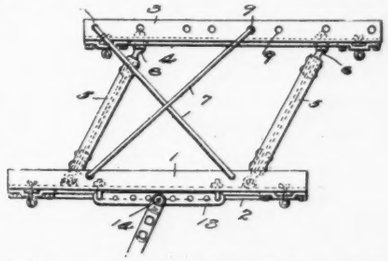
In a road scraper or similar implement, the combination of two scraper bars, links connecting the bars in parallel relation and



a rigid brace connecting the bars to hold them in adjusted position.

939,731. EXCAVATING-MACHINE. David W. Miller, Chicago, Ill. Serial No. 351,347.

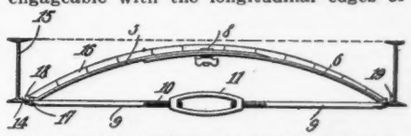
In a wheel-excavator, the combination with a wheel frame, of a series of scraper



blades mounted upon the periphery of the wheel and arranged approximately radial thereto, and diggers interposed between the scrapers and projecting radially beyond the acting edges of the latter.

938,718. COLLAPSIBLE ARCH-CENTERING FORM. Ansel R. Smith, Marion, Ind. Serial No. 443,576.

In an arch-centering device, a form supporting member comprising a pair of arched and elastic plates, flat at their outer ends, and terminating in upstanding flanges, an adjustable connection between said plates for setting the same to the desired radius of the arch, the upstanding flanges being engageable with the longitudinal edges of



the form for holding the same in place on the supporting member, an adjustable sliding member engageable at its ends with the flattened ends of the supporting member, fastening means passing through said flattened ends and through the ends of the sliding member, said sliding member having its outer ends notched to receive the edges of the floor beams, whereby the device is supported by said beams, and means for lengthening and shortening the sliding member, whereby the device is set simultaneously for arches of different spans and radii.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Street Railways—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we can not guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

BIDS ASKED FOR

STREET IMPROVEMENTS

Ohio	Cincinnati	Dec.	3, noon	Granite block paving, curb, grading, 2 streets	John J. Wenner, Clk. Bd. Pub. Ser.
Texas	Houston	Dec.	5	Laying over a mile of cement sidewalks	Magnolia Park Land Co.
New Jersey	Gloucester	Dec.	6	Vit. brick paving on 4 streets	Street Committee of Council.
Arkansas	Jonesboro	Dec.	6, 2 p.m.	Paving 23,000 sq. yds., any material; curb and gutter, 10,000 lin. ft.: concrete sidewalks, 105,000 sq ft	H. H. Houghton, Sec'y Imp. Dist. 4.
California	San Rafael	Dec.	6, 1 p m	Grading and macadamizing 2,400 ft. of road, Dist. No. 10	R. E. Graham, Clk. Bd. Superv.
New York	New York	Dec.	6, 2 p.m.	Regrading, curbing, flagging, retaining wall, etc.	John F. Ahearn, Pres. Boro. Manh'n.
New York	Long Island City.	Dec.	6, 11 a.m.	Asphalt block paving, 12,700 sq. yds.; flag sidewalks, 78,850 sq. ft.; grading, 161,000 cu. yds embankment and 9,600 cu. yds., earth excavation	Lawrence Gresser, Pres. QueensBoro.
Missouri	Macon	Dec.	6, 8 p.m.	Constructing sidewalks on various streets	E. W. English, City Clerk.
Indiana	Delphi	Dec.	6	Bldg. 2 roads in Monroe township	M. G. Haun, County Auditor.
Indiana	Greensburg	Dec.	6, 1 p.m.	Bldg. macadam road, 10,660 ft. long, in Fugit twp.	Frank E. Ryan, County Auditor.
Indiana	Tipton	Dec.	6, 10 a.m.	Constructing 7 gravel roads; total length, 28,623 ft.	J. F. Barlow, County Auditor.
Indiana	Boonville	Dec.	6, 2 p.m.	Constructing three gravel roads	Ray F. Cherry, County Auditor.
Mississippi	Vicksburg	Dec.	6, 8 p.m.	Paving 15 blocks on 3 streets with vit. brick, granitoid, bitulithic, asphalt, mineral rubber and creosoted wooden block	C. R. Twiss, City Engineer.
Indiana	Crawfordsville	Dec.	7	Constructing a highway in Madison township	B. B. Engle, County Auditor.
Indiana	Rockville	Dec.	7, 1:30 p.m.	Bldg. Brockway-Marshall road in Wabash twp.	H. A. Henderson, County Auditor.
Indiana	Vincennes	Dec.	7, 2 p.m.	Bldg. 4 gravel roads, total length, 15,660 ft.	J. T. Scott, County Auditor.
Indiana	Fowler	Dec.	7, 1 p.m.	Constructing 16 rock roads for Benton County	Lemuel Shipman, County Auditor.
Indiana	Logansport	Dec.	7, 10 a.m.	Bldg. new sidewalk on Creott bridge over Wabash river	Geo. W. Cann, County Auditor.
Indiana	Madison	Dec.	7, 1 p.m.	Grading, macadamizing, etc., 5.59 miles road; cost, $7,844	G. F. Crozier, County Auditor.
Indiana	Wabash	Dec.	7, 1 p.m.	Bldg. gravel road on line between Lagro and Chester twps.	J. P. Noftzger, County Auditor.
Indiana	South Bend	Dec.	7	Asphalt-macadam paving on 3 avenues	W. A. McInerney, Chm. B. P. W.
Indiana	Kendallville	Dec.	7, 7:30 p.m.	Paving 21,000 sq. yds. creo. wood block or cement concrete; cement curb, 8,000 ft.; cost, $57,390	Wm. P. Myers, City Clerk.
Maryland	Upper Marlboro.	Dec.	7	Grading and macadamizing one mile on road to D. C. line	H. St. J. Briscoe, Clk. Co. Comrs.
New Jersey	Trenton	Dec	7, 8 p.m.	Grading Edgemere ave.	Abram Swan, City Engineer.
Louisiana	Homer	Dec.	7	Five miles of concrete paving for town	G. G. Gill, Town Clerk.
Pennsylvania	Butler	Dec.	7, 8 p.m.	Bldg. stone, brick or cement walks on various streets	H. E. Coulter, Sec'y Boro. Council.
New Hampshire	Concord	Dec.	8, 5 p.m.	Grading and surfacing with gravel, 5 miles of 2 roads	A. W. Dean, State Engineer.
Indiana	Brazil	Dec.	8	Constructing 8,328 ft. gravel road in Washington twp.	Jas. L. Burnes, County Auditor.
Indiana	Muncie	Dec.	8	Brick paving, grading, draining, road in Center twp.	Jos. E. Davis, County Auditor.
Indiana	Peru	Dec.	8, noon	Bldg. 3 gravel roads, 46,879 ft. long; cost, $40,249	Chas. Griswold, County Auditor.
Indiana	La Porte	Dec.	8	Bldg. 4,917 ft. macadamized road in Center twp.	Chas. H. Miller, County Auditor.
Minnesota	St. Paul	Dec.	9	Constructing the Otter Lake road	Edw. G. Krahmer, Co. Auditor.
Arizona	Phoenix	Dec.	10, 2 p.m.	Bldg. 6 5-8 miles oil macadamized road	Geo M. Halm, Chm. Rd. Dist. No. 1.
Texas	Houston	Dec.	13	Brick paving San Jacinto, Main Travis sts.; Wabash ave.	T. C. Tarver, City Engineer.
North Carolina	Wil on	Dec.	15	Macadamizing 8 to 10 miles of road	J. C. Hales, Sec'y Twp. Rd. Com'rs.
New Jersey	Flemington	Dec.	16	Bldg. Asbury-Ludlow Station road; Grant Davis, Co. Engr.	J. W. Sharp, Director of Freeholders.
Ohio	Shawnee	Dec.	17, noon	Vit. brick paving on Main street	John D. Davis, Village Clerk.
Indiana	Lebanon	Dec.	17, 7:30 p.m.	Constructing sidewalks on Park street	Edmund Conner, City Clerk.
Illinois	Piper City	Dec.	18	Brick paving, 8,231 sq. yds. on 6-in. concrete; curb, 2,572 ft.	N. G. Plank, City Clerk.
Colorado	Golden	Dec.	18	Bldg. permanent driveway or boulevard	C. W. Comstock, State Engr.
Alabama	Huntsville	Dec.	28	Paving 20,600 sq yds., any material; curb, 11,200 lin. ft	Thomas W. Smith, Mayor.

SEWERAGE

Nebraska	Omaha	Dec.	6, 2 p.m.	Bldg. 18 and 12-in. pipe sewer, Dist. 398; three 8-in., Dist. 388.	Dan B. Butler, City Clerk.
Dist. of Col'bia	Washington	Dec	6, noon	Constructing sewers	Asa Phillips, Supt. of Sewers.
Kansas	Wichita	Dec.	6, 9 a.m.	Bldg. main San. Sewer No. 12: 5.300 ft. 45-in., 11,837 ft. 42-in., 2,793 ft. 39-in., 3,963 ft. 36-in., double-ring brick or rein. concrete block or tile sewer, 3,870 ft. 30-in. single-ring brick or rein. conc. block, 1,356 ft. 24-in. vit. tile, 87 manholes, outlet protection and special creek crossing	Bert C. Wells, City Engr.
New York	New York	Dec.	6, 2 p.m.	Bldg. 390 ft. 3 1-2 x 2 1-3 ft. brick sewer, etc., 3 streets	John F. Ahearn, Pres. Boro. Manh'n.
Ohio	Cincinnati	Dec.	6	Bldg. sewers in Hewitt ave. and rights-of-way	J. J. Wenner, Clk. Bd. Pub. Service.
Indiana	Greenfield	Dec.	6, 10 a.m.	Bldg. sewer system at County Hospital	Charles H. Troy, County Auditor.
Ontario	Coburg	Dec.	6	Bldg. 2,000 ft. 8-in. vit. tile drain, 6 to 14 ft. deep	D. H. Minaker, Town Clerk.
Kansas	Great Bend	Dec.	7, 2 p.m.	Bldg. sanitary sewer system, inc. separate bid for trunk lines and septic tank; also laterals; unit prices	W. K. Palmer Co., Dwight Building, Kansas City, Mo.
Iowa	Storm Lake	Dec.	7	Bldg. 8 1-2 miles 8-15-in. san. sewers and disposal plant	C. P. Chase, Clinton, Engr.
New Jersey	Trenton	Dec.	7, 8 p.m.	Bldg. sewers in Hoffman st. and West End ave.	Harry B. Salter, City Clerk.
New York	Brooklyn	Dec.	8, 11 a.m.	Bldg. and rebldg. sewers in various streets	Bird S. Coler, Boro. President.
New York	Brooklyn	Dec.	8, 11 a.m.	Bldg. pump well, screen and grit chambers and appurtenances at Coney Island disposal works	Bird S. Coler, Boro. President.
Ohio	Elmwood Place	Dec.	10, noon	Bldg. sewers, disposal plant, flushing tunnels, drains, ditches and appurtenances	T. T. McQueen, Clk. of Council.
Texas	Houston	Dec.	13	Bldg. sanitary sewers in Fifth Ward: 3,065 ft. 30-in., 2,850 ft. 24-in., 1,375 ft. 20-in., 11,151 ft. 15-in., 1,552 ft. 12-in., 1,450 ft. 10-in. vitrified pipe	Dan C. Smith, Jr., City Clerk.
Nevada	Carson City	Dec.	13, 7 p.m.	Bldg. sewer in Plaza and Rice streets	E. O. Patterson, City Clerk.
Kentucky	Louisville	Dec.	17	Bldg. 21st st. sewer; Contract 58: 2,150 ft. 60-in. rein. concrete, 1,566 ft. 48-in. unrein. conc., inc. 3,746 ft. earth excav., 7 to 30 ft. deep, 970 cu. yds. rein. concrete, 520 cu yds. unrein. concrete, 60,000 lbs. steel reinforcement	P. L. Atherton, Chm. Sewer Com'n.

WATER SUPPLY

New York	Brooklyn	Dec.	3, 2 p.m.	Furn. and laying 2 trunk distributing mains; $350,000 bond	J. H. O'Brien, Comr. W. S., G. & E.
Oklahoma	Oklahoma City	Dec.	6	Bldg. Broadway and Walker ave. storm sewers; also laterals	Bob Parman, City Clerk.
Oklahoma	Okeene	Dec.	6, 6 p.m.	Material and labor for w.w.: 2,490 ft. 8-in., 1,980 ft. 6-in., 15,474 ft. 4-in. c. i. pipe; 6,425 lbs. specials, 29 hydrants, 21 gate valves and boxes, 65,000-gal. tank on 100-ft. steel tower; two 150 G. P. M. 15 h.p. and 100 G. P. M. 10 h.p. cent. pump-open well and pump house; 5,000-gal. per hour softening plant, etc	O. G. Groalman, Town Clerk.
Quebec	Hull	Dec.	6, 4 p.m.	Furn. and erect. set of duplex or triple power pumps, 6,000,000-gal. capacity per day; also turbine wheels for operation of same; R. W. Farley, City Engineer	John F. Boult, City Clerk.
New York	Newburgh	Dec.	6, 7:30 p.m.	Bldg. new gate house and boiler house	Wm. H. Hawks, Pres. Water Board.
New Jersey	East Orange	Dec.	7, 8 p.m.	Furnishing 310 tons c. i. water pipe, and 50 tons specials	A. A. Reimer, Clk. Water Board.
Mississippi	Gulfport	Dec.	7, 8 p.m.	Furn. and laying 14,580 ft. 8-in. pipe, 27,700 ft. 6-in. and 2,000 ft. 4-in.; 21 tons specials, 47 extension valves, thirty 6-in., fifteen 8-in. and two 10-in. valves; 63 fire, 810 steamer hydrants, 4 and 6-in. connections; cost, $34,000: also for bldg. pumping station, furn fire pump, constant duty pump and fire alarm system; cost, $50,000	M. F. Sullivan, City Engineer.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			WATER SUPPLY—Continued	
Ontario	Toronto	Dec. 7	Furn. supplies for 1910, inc. 2,670 lengths 12-in. c. i. pipe, lead pipe, stop valves, specials, hydrants, sewer pipe and brick, paving brick, granite boulders, asphalt, granite paving block, crushed stone, cement, steel, etc.	Jos. Oliver, Chm. Bd. Control.
New York	New York	Dec. 8, 2 p.m.	Furn. and laying mains, 1st and 2nd Wards, Boro. Queens; also in Bronx; sinking wells at Whitestone, Queens Boro.	J. H. O'Brien, Com'r W. S., G. & E.
Texas	Dallas	Dec. 8, 3 p.m.	Furn. 5,334 tons 8 to 36-in. piping; cost, $140,000; for bldg. main line from White Rock reservoir and branch lines; also specials.	D. F. Sullivan, W.W. and Sew.Comr.
New York	New York	Dec. 8, 11 a.m.	Bldg. Hill View reservoir, etc., and portions of Yonkers and Van Cortlandt siphons of Catskill aqueduct; Cont. 30; earth embankments, lined with concrete, 3,000 x 1500 ft.; siphons, lined with concrete, 16 ft. 7 in. in diameter.	Board of Water Supply.
California	San Francisco	Dec. 8	Bldg. Twin Peaks reservoir	Marsden Manson, City Engr.
Mississippi	Vaiden	Dec. 8	Material and labor for bldg. $21,000 water works	C. L. Armstrong, City Clerk.
Minnesota	Minneapolis	Dec. 10	Furn. and install. 2 boilers at Northeast pumping station	Henry N. Knott, City Clerk.
Missouri	Kansas City	Dec. 13, 2 p.m.	Furn.and erect. horizontal, cross-compound crank and fly-wheel condensing pump engine, complete, at Quindaro	Board of W. W. Trustees.
Colorado	Ft. Logan	Dec. 14, 9 a.m.	Bldg. pump house, also elec. wiring, boilers, etc.; air compressor, steam pumps and piping; also alternate bids	Capt. Chase Doster, Constr. Q. M.
Nebraska	Belden	Dec. 15, 1 p.m.	Bldg. stand pipe and foundation, installing pipe, valves, hydrants, etc.; open well and triplex deep well pump; A. C. Koenig, C.E., Bee Bldg., Omaha.	F. B. Barber, Village Clerk.
Kansas	Erie	Dec. 15	Bldg. $50,000 w. w. and electric light plant; Burns & McDonnell	J. C. Demons, City Clerk.
California	San Francisco	Dec. 15	Bldg. pumping station at Second and Townsend sts.	Marsden Manson, City Engr.
Louisiana	Alexandria	Dec. 20	New work at water and light plant; cost, $40,000	I. W. Sylvester, City Eng'r.
Philippine Is'ds	Manila	Dec. 29, 11 a.m.	Installing distribution system of Manila gravity water supply; $5,000 deposit with each bid	Municipal Board of Manila.
Minnesota	Foley	Jan. 1, 7 p.m.	Building complete water works system; cost, $7,000; old bids rejected; O. Claussen, C.E., Nat'l Ger.-Am. Bk. Bldg., St. Paul	Frank J. Kotsmith, Village Recorder.
Nebraska	Carroll	Jan. 11	Constructing water works; previous bids rejected	City Clerk.
			BRIDGES	
California	Jackson	Dec. 6	Constructing two steel bridges	County Club of Amador County.
Nebraska	Plattsmouth	Dec. 6, 3 p.m.	Bldg. wood and steel bridges for County during 1910.	W. E. Rosencrans, County Clerk.
Indiana	Rensselaer	Dec. 6, noon.	Bldg. steel bridge in Walker twp., 55 ft. long, 16 ft. wide.	J. N. Leatherman, Co. Auditor.
Manitoba	Cameron	Dec. 6, 5 p.m.	Bldg. pile bridge across Souris river, near Lauder.	T. B. Woodhull, City Sec'y-Treas.
New York	Rome	Dec. 6	Bldg. riveted steel highway bridge over Mohawk river.	J. L. Plunkett, City Engineer.
Kansas	Leavenworth	Dec. 6, noon.	Bldg. 3 steel span bridges with 14-ft. roadways, 48, 60 and 76 ft. long; cost, $2,300, $2,500 and $3,000; also culvert 16 x 16 ft.	J. W. Niehaus, County Clerk.
Pennsylvania	Monongahela City	Dec. 6, noon.	Removing super and sub-structure of old bridge over river.	R. J. Cunningham, Co. Controller.
Ohio	Cincinnati	Dec. 6, noon.	Bldg. sub and superstructure of lift bridge over M. & E. canal	J. J. Wenner, Clk. Bd. Pub. Service.
Arizona	Phoenix	Dec. 6	Bldg. $100,000 bridge over Salt River at Center st.; new bids	Board of Supervisors.
Indiana	Vincennes	Dec. 7, 2 p.m.	Bldg. 50-ft., also 25-ft. concrete abutment for two bridges.	John T. Scott, County Auditor.
California	Salinas	Dec. 7, 2 p.m.	Bldg. hwy. bridge on reinf. concrete piles, St. Paul's Isd.	T. P. Joy, Clk. Bd. Supervisors.
Indiana	Rochester	Dec. 7, 2 p.m.	Repairing a steel bridge	G. W Du Bois, County Auditor.
Kansas	Newton	Dec. 7	Bldg. one 3-span pile bridge between Harvey and Butler Cos.	Board of County Com'rs.
Arizona	Phoenix	Dec. 8, 2 p.m.	Bldg. rein. concrete bridge 700 ft. long, near Florence	J. J. Riggs, Sec'y Bd. Control.
Quebec	Arthabaska	Dec. 9	Bldg. steel bridge over Becaneour river	Louis Lavergne, Sec'y-Treas.
Washington	Tacoma	Dec. 15, 11 a.m.	Material and labor for bldg. $60,000 concrete girder bridge over gulch between Fife and Oakes sts.; 7 spans, 360 ft. long.	H. J. McGregor, Com'r Pub. Wks.
Ohio	Lockland	Dec. 17	Bldg. concrete bridge over Mill creek at Benson st.	Fred Dreihs, Clk. Co. Comrs.
Washington	Colfax	Dec. 20	Bldg. two 130-ft. riveted steel truss bridges.	John M. McCaw, County Engr.
California	Merced	Jan. 4, 10 a.m.	Bldg. steel bridge over Merced river road, Dist. No. 4.	P. J. Thornton, Clk. Bd. Supervisors.
			LIGHTING AND POWER	
California	Martinez	Dec. 6	Fifty-year franchise to erect poles and wires over Co. roads.	J. H. Wells, Clk. Co. Supervisors.
North Dakota	Fargo	Dec. 7, noon.	Wiring county hospital building	Arthur G. Lewis, County Auditor.
Texas	Houston	Dec. 8	Electric fixtures for Court House; cost, $15,000.	A. E. Amerman, County Judge.
Ohio	Columbus	Dec. 10	Power equipment for plant for State Penitentiary, inc. dir. con. units of a. c. generators and cross compound Corliss engine, 2 turbo-generators, 2 boiler-feed pumps, water feed heater, electric traveling crane, 4 automatic stokers.	Osborn Eng. Co., Cleveland.
Indiana	New Albany	Dec. 14	Lighting sts.. alleys and public places of city for 10 years from Sept. 1, 1910; $10,000 check with bids.	John C. Short, City Clerk.
Virginia	Richmond	Dec. 14	Bldg. electrical transmission lines for city	E. E. Davis, Supt. Water Dept.
Pennsylvania	Nanticoke	Dec. 14	Lighting sts. with electric arcs for 1, 3 and 5 years, from May 1, 1910.	Clem J. Knoll, Boro. Sec'y.
Kansas	Erie	Dec. 15	Bldg. $50,000 electric light and water plant.	Burns & McDonnell, Scarrett Bldg., Kansas City, Mo., Engineers.
Louisiana	Alexandria	Dec. 20	New work at light and water plant; cost, $40,000	J. P. Turregano, Mayor.
			MISCELLANEOUS	
New York	New York	Dec. 3, noon.	Bldg. dumping board, Clinton ave., Brooklyn; 158th st., North River, Manhattan.	Wm. H. Edwards, Comr. St. Clean'g.
Pennsylvania	Fountain Hill	Dec. 6, 8 p.m.	Removal of ashes and garbage for one year from Jan. 1.	J. A. Titlow, Sec'y Boro. Council.
Ontario	Toronto	Dec. 7	Furn. st. signs, cement, sewer and water pipe, paving material and other supplies for 1910.	Jos. Oliver, Mayor.
New York	New York	Dec. 9, 2 p.m.	Furn. duplex, steam-driven air compressor to Brooklyn bridge.	J. W. Stevenson, Com'r Bridges.
Pennsylvania	Philadelphia	Dec. 10	Bldg. substructure of Vine st. pier, $300,000 available; to provide for sewer through pier; $400,000 superstructure later.	Acting Dir. Hasskarl of Dock Dept.
Oregon	Portland	Dec. 20	Constructing garbage crematory; $150,000 bonds voted.	City Comptroller.
California	San Francisco	Dec. 22	Furn. fire hose for auxiliary fire system	Marsden Manson, City Engr.
Massachusetts	Springfield	Dec. 22, 3 p.m.	Excavation, mason work, etc., for auditorium, tower and passage, Municipal Bldg. and terrace and steps of new Municipal bldgs.; Pell & Corbett, 122–124 E. 25th st., N. Y. City, Archs.	Municipal Bldg. Commission.

STREET IMPROVEMENTS

Birmingham, Ala.—H. B. Thompson & Co. will purchase concrete mixer, batch capacity one cubic yard; prices f. o. b. Pensacola, Fla., must be given.

Huntsville, Ala.—Council adopted ordinance providing for $15,000 bond issue to pave Holmes st.—Thomas W. Smith, Mayor.

Paris, Ark.—City is planning paving court house square.

Oakland, Cal.—Board of Trustees of town of Piedmont is urging election on $400,000 bonds for improvement of streets and parks, erection of engine house and purchase of an engine.

San Jose, Cal.—City Superintendent of Streets Trace and City Engineer Pieper have obtained from Newby & Scott an estimate of expense of protecting Fourteenth st. from ravages of the Coyote Creek by system of wing dams, piling, brush mats, etc.; cost, about $1,250.

Hartford, Conn.—Board of Park Commissioners is considering plan submitted by G. A. Parker, Superintendent of Parks, for construction of quarter-mile speedway in Riverside Park.

Wethersfield, Conn.—Fire District has decided to issue $10,000 bonds for construction of sidewalks.

Jacksonville, Fla.—County Engineer has estimated cost of proposed paving of road from Floral Bluff to Gilmore at $10,905.96.

Key West, Fla.—City is desirous of correspondence with engineer relative to street improvements.—I. N. Fogarty, Mayor.

Ocala, Fla.—Council has passed ordinance providing for paving of Fort King ave. with vitrified brick.

St. Petersburg, Fla.—Council has decided to pave portion of Central ave. with brick.

Moline, Ill.—Moline and East Moline business men are urging paving of Fourth ave.

Springfield, Ill.—Board of Local Improvements has approved petition for paving South Seventh st.; bids will soon be advertised.

Indianapolis, Ind.—Board of Public Works has adopted resolution for paving Thirty-fourth st; cost, $15,938.

Paoli, Ind.—Board of Commissioners of Orange County received no bids for construction of two roads in Greenfield Township; bids will be readvertised.—Alvin B. Ham, County Auditor.

Petersburg, Ind.—Pike County Board of Commissioners have rejected all bids for construction of six rock roads.—Frank L. Bilderback, County Auditor.

Fairfield, Ia.—City is considering construction of quantity of brick paving.—W. L. Long, City Clerk.

Olathe, Kan.—Johnson County Commis-

sioners are considering construction of three macadam roads.—Roy Murray, County Engineer.

Lexington, Ky.—Plans will be prepared by P. P. O'Neil, City Engineer, for additional street paving.

Lexington, Ky.—Board of Public Works has decided to expend several thousand dollars on reconstruction of brick streets in different parts of city.—P. P. O'Neil, City Engineer.

Richmond, Ky.—No contract was let for constructing macadam roads, as all bids were unfavorable; bids will be again asked in spring.—J. R. Johnson is interested.

New Orleans, La.—Streets and Landings Committee has reported favorably on paving of portion of St. Charles ave. with bitulithic.

New Orleans, La.—Residents of Bienville ave. are considering paving of that thoroughfare.

Providence, La.—City has decided to pave 34 blocks of sidewalk.—T. J. Powell, Mayor.

Haverhill, Mass.—Mayor Moulton is planning to do considerable paving work next year.

Marblehead, Mass.—Town is considering extension of Cliff st.; cost, $40,000.

Russell, Mass.—Town will appropriate $1,000 providing State Highway Commission provides like amount, to properly repair highway from this village to Blandford.

Calumet, Mich.—Red Jacket Village Council is considering proposed extension of Fifth st.

Detroit, Mich.—Ford City Council has decided to pave Biddle ave.; citizens will vote on $70,000 bonds.

Saginaw, Mich.—Emerson, Meredith, Holden, McCoskry and Atwater sts. will be paved with tar macadam; cost, $26,000.

Duluth, Minn.—Board of Public Works has been asked to pave East Fourth st.

Faribault, Minn.—Council has appointed committee to investigate creosoted block pavements.

Gulfport, Miss.—Citizens will vote on $98,000 bonds for street paving.—M. F. Sullivan, City Engineer.

St. Louis, Mo.—City will pave High and four other streets with wooden paving blocks.—Charles Gaylor, City Engineer.

Springfield, Mo.—Council has instructed Missouri Pacific R. R. Co. to pave Water st.

University, Mo.—Plans will be prepared by Consulting Engineer H. B. Colby, Security Bldg., St. Louis, for brick paving, on concrete foundation, on Pennsylvania ave.; cost, $15,000.—E. G. Lewis, Mayor.

Lewiston, Mont.—County Board will improve roads in vicinty of Roundup.

Missoula, Mont.—City has had plans prepared for immediate construction of half a mile of cement walks.

Hastings, Neb.—Council has created improvement districts including Third st. and Lincoln ave. Street Commissioner will make estimate of cost; bonds will be voted.—Address City Clerk Bratton.

South Omaha, Neb.—Bids will be received for 90,000 sq. yds. asphalt, brick, stone and filled macadam paving for 14 streets.—G. W. Roberts, City Engineer.

Albany, N. Y.—State Highway Commission has petitioned Public Service Commission for elimination of grade crossings in village of Slingerlands, in the town of Glenville, Schenectady County, and in town of Wheatland, Monroe County.

Amityville, L. I., N. Y.—Town has voted $8,000 to Peekskill gravel Broadway and Park ave.

Painted Post, N. Y.—Engineer representing State Highway Department has offered to submit to the Village Board estimate of cost of paving with brick section of new state road which is to pass through the village; if brick is used in construction of the road, it is understood that the village will have to bear difference in the cost between the brick and macadam pavement. Board is also securing estimates of cost of placing concrete or stone curbing along line of the State road from where it enters the village limits on East Water st. until it passes beyond its limits at Cohocton River bridge; Monument square will also be paved with brick.

Jonesboro, N. C.—Jonesboro Township is considering issuance of bonds for road improvements.

Bellefontaine, O.—Plans are being prepared by City Engineer C. Inskeep for ½ mile vitrified brick paving and stone curb and gutter on Elm st.; bids will be received in early spring.—Vance Horn, Clerk Board of Public Service.

Canton, O.—Engineer Starrett has estimated cost of paving West Lake and Tyler sts. at $16,058 and $4,937, respectively.

Dayton, O.—City Engineer Cellarius has sent to Service Board estimates on six jobs; improvements are: Grading and graveling Bickham st., $1,217.10; grading and making sidewalks on Salem st., sidewalks, 12 cents sq. ft.; combined curb and gutter, etc., 75 cents lin. ft.; sidewalks on south side of River st., 12 cents; sidewalks, combined curb and gutter, etc., on Bickham st., curb and gutter, 96 cents lin. ft.; grading and sidewalks, 10 cents sq. ft.; alley mouths, 15 cents sq. ft. For the paving of the alley west of Wayne ave. the estimate was: Brick, $1,409.24; cement, $1,125.04.

Ironton, O.—Council has ordered improvement of Fourth st. by grading, combination cement curb and gutter and paving.—G. W. Golden, Mayor.

Mt. Gilead, O.—County Commissioners have instructed Surveyor Underwood to establish the grade, and make plats and profiles, together with plans and specifications and an estimate of the cost of constructing proposed pike from this city to Edison.

St. Clairsville, O.—Part of $22,650.78 street improvement bonds have been sold as follows: Rietta st., first section, Hayden, Miller & Co., Cleveland, $13,848.96, premium $164; Marietta st., second section, James P. McMonies, bonds 11 to 20, $1,831.30, premium, $85.85; Main st., bonds 12 to 20, A. L. Bumgartner, $2,312.64, premium $35.

Youngstown, O.—Council has passed resolution providing for paving of portion of George st.

Oklahoma City, Okla.—City has decided to pave portions of 27th st. and four other streets.—Bob Parman, City Clerk.

Portland, Ore.—Paving of large portion of Portland Heights streets is being considered.

Portland, Ore.—City will lay about 80 miles of hard surface pavements next summer.—Address Mayor Simon.

Altoona, Pa.—City Engineer Franz Engstrom is engaged in making out list of streets for which legislation has been enacted by Councils for paving, getting them in proper order of precedence and ascertaining those for which grade has never been established.

Pittsburg, Pa.—Fifth ave. may be widened to 60 ft. between Grant and Ross sts., simultaneously with removal of the hump.—William A. Magee, Mayor.

Wyebrooke, Pa.—Supervisors of West Nautmeal Township will expend $5,000 for crushed stone to be used in improvement of streets in vicinity of Wyebrooke, Loag's and Manor Church.

Sioux Falls, S. D.—Council has decided to construct cement curb and gutter on three streets and cement sidewalk on Seventh st.

Memphis, Tenn.—City will issue $425,000 street improvement bonds.—James H. Malone, Mayor.

Ballinger, Tex.—Commissioners Precinct No. 1, Runnels County, will vote Dec. 18 on $100,000 bonds for road improvements.

Beaumont, Tex.—Jefferson County will vote January 11 on $50,000 bonds for road improvements; 15 miles of macadamized road will be built.

Georgetown, Tex.—Council has passed ordinance requiring all property owners to build cement sidewalks in residence portions; about two miles of sidewalks will be built in the next sixty days as the ordinance directs.

Granbury, Tex.—Commissioners' Precinct No. 1, Hood County, has voted $25,000 road improvement bonds.

Hempstead, Tex.—Waller County has voted $25,000 bonds for road improvements in Precinct No. 1.

Sherman, Tex.—Messrs. E. A. Thompson and John Luggs, Denison, have petitioned County Commissioners for creation of road improvement district to include city of Denison; election on $250,000 bonds is also asked.

Brigham City, Utah.—County Commissioners will grant petition of residents of Pocatello valley and West Portage to open road connecting Pocatello valley with the Malad Valley Railroad at West Portage.

Cheney, Wash.—Fourth st. residents have petitioned for formation of Fourth st. Improvement District.

Tacoma, Wash.—Council has decided to construct cement sidewalks in local improvement district No. 726; cost, $2,799.

Vancouver, Wash.—Council has authorized the City Engineer to prepare plans and specifications for improvement of Main st., from 12th to 26th, with hard surface pavement; demand for the paving of the connecting streets has been made.

Beloit, Wis.—Board of Public Works has estimated cost of improving Euclid ave. at $7.32 per lin ft.—J. L. Hendley, Chairman.

Brockville, Ont., Can.—County Councils of Leeds and Grenville have approved by-law to expend $300,000 on construction and improvement of roads.

Montreal, Que., Can.—Council has authorized expenditure of $2,000 for macadamizing Nicolet st. and $16,000 for paving section of St. James st.

Welland, Ont., Can.—By-law will be submitted to ratepayers in January, to provide for construction of pavements on number of streets.

BIDS RECEIVED AND CONTRACTS AWARDED

Jacksonville, Fla.—New Riverside Company has awarded contract to D. M. Baker, city, for two and one-half miles of additional paving in New Riverside.

Pensacola, Fla.—The Board of Works has awarded the sidewalk contracting firm of Whiddon Construction Co. the contract for building crosswalks over the grass plots on all streets where the paving will be placed at 11c. per ft., which makes the total expenditure $4,950. The Whiddon Construction Co. and the Chamberlain-Freeman Construction Co., of Chattanooga, were the only bidders, and both quoted the same figures; it was specified that the name of all streets be placed in the crosswalks, after the manner of placing them on the sidewalks built by the same firm.

Belleville, Ill.—Contracts amounting to $88,547.20 for street improvements have been awarded by Board of Local Improvements. Following are the figures submitted:

Highland Paving District, including Wabash and Portland aves. and Monroe st.: John Cherry, Jr., $30,351.40; Reeb Bros., $30,899.30.

Douglass ave.: Reeb Bros., $9,533; Geisel Construction Co., St. Louis, $9,709.50.

Oak st.: John Cherry, $10,855; Hoeffken Bros., $10,942.50; Geisel Construction Co., $11,016.

Walnut st.: Hoeffken Bros., $12,922; Geisel Construction Co., $13,357.

D st.: John Cherry, $20,565; Hoeffken Bros., $20,727.50; Geisel Construction Co., $21,285.50.

Third st.: John Cherry, $4,320.80; Reeb Bros., $4,351.60; Geisel Construction Co., $4,426.40.

Champaign, Ill.—John W. Stipes, 79 Dearborn st., has secured contract for paving with Culver block portion of 4th st. for $35,571.

Clinton, Ill.—Board of Local Improvement, Nov. 15, awarded contract for street improvements to John Bretz, Springfield, for $25,717.

Peoria, Ill.—Alvin D. Thompson has been awarded contract for grading, curbing and paving with brick Pacific st. for $7,506.—George F. Simmons, President Board of Local Improvements.

Indianapolis, Ind.—Board Public Works has awarded contracts for constructing cement walks as follows: Keystone ave., M. Sapirio, $1.29 per sq. yd.. and 16th st., John Arnold, $1.29 per sq. yd.

Indianapolis, Ind.—Lackey Bros. submitted low bid for brick roadway on 11th st. at $1.15 per ft.

Marion, Ind.—The Board of Works has let contract for the construction of the Race st. sidewalks from 10th to 12th sts. to Dillard Artis at 13c. William Yates was awarded the contract for the construction of Gallatin st. from 14th to 17th sts. at $4,155.33.

Lexington, Ky.—The Board of Public Works Nov. 22 opened bids for the construction of concrete sidewalks and guttering in various parts of the city, and the bids of Justice & Co. and the Hughes-Forman Co. were accepted and recommended to the Joint Improvement Committee as follows: Hughes-Forman Co., sidewalks on East Short st., 11½c. per sq. ft. for sidewalks and 39c. per lin. ft. for gutter and curb; Hughes-Forman Co., sidewalks on Columbia ave., 11c., and 39c. for curb and gutter; Justice & Co., sidewalks and guttering on the following sts. at 11c. for sidewalks and 40c. for curb and gutter: Main, Church, 4th and North Limestone sts.

Paducah, Ky.—A. J. Miller & Son, Lynchburg, Va., has been awarded contract for cement sidewalks 4 in. thick on 8-in. cinder base, on which following bids were received: M. H. Weikel, city, $33,954.15; A. J. Miller, Lynchburg, Va., $31,200.68; Bigler Bros., Goldsboro, N. C., $33,285.62; Wilcox & Caldwell, city, $33,815.80; W. Y. Noble, city, $33,695.59; Meacham Contracting Co., Hopkinsville, Ky., $32,360.64; George A. Gardner, city, $35,602.48; J. D. McGee, Augusta, Ga., $33,075.16; Chas. L. Robertson, city ,$39,754.05; Yancey & Johnson, city, $38,771.25; A. C. Butterworth, St. Louis, Mo., $40,724.45; W. M. Leftwich & Co., Nashville, Tenn., $31,983.87; Thomas J. Sale, Enid, Okla., $31,561.57; Kafferjohn, city, $32,471.79.

Same firm also awarded contract for granite curb, 6 x 14 in., set on concrete base, 6 x 12 in., including grading at 81c.

Amount above is result of aggregate of each bid on following amounts: 97,390 sq. ft. sidewalk; 7,210 sq. ft. concrete driveways; 17,660 lin. ft. granite curbing set; 17,580 ft. concrete gutter 8 x 18, 1-in. floating top; 1,326 ft. 4-in. c.-i. drain pipe under sidewalk and through curb for yard drainage. 3¼-in. concrete with ¾-in. top, made of 1½ sand and 1 part cement. Concrete

1:2½:5. Excavation included.—L. A. Washington, City Engineer.

Lake Providence, La.—City has awarded contract to Knight & Sanford, Atlanta, Ga., to pave two miles of sidewalks.

Lincoln, Neb.—Following bids have been opened for paving with brick 9,000 yds. on portion of 26th st.: M. Ford, $1.97 per sq. yd., and Abel & Roberts, $2.06 per sq. yd.

Hoboken, N. J.—The Common Council has awarded contract for laying wood block pavement in 1st st., between Garden and Marshall sts., to Contractor Richard Lamb, who also was awarded contract for laying wood block pavement around City Hall, on Washington, 1st, Newark and Bloomfield sts.

Contract for asphalting 7th st., from Garden st. to Park ave., was granted to Barber Asphalt Company.

Mineola, L. I., N. Y.—Bids were opened, Nov. 22, by Board of County Supervisors for macadamizing Marcus ave. in North Hempstead, and the contract has been awarded to Andrews Bros., of Mineola, as follows: 15,000 cu. yds. grading, 30c.; 7,826 sq. yds. macadam, 72c. if finished old way, sand screenings, etc.; 9,387 sq. yds. macadam, 82c. if Tarvia is used as binder; 9,387 sq. yds. macadam, 83c. if standard asphalt is used as binder; 120 lin. ft. 12-in. culvert, $1.75; 72 lin. ft. 16-in. culvert, $2.25. —Engineer, H. E. Hawkhurst, Westerly.

Syracuse, N. Y.—C. J. Sullivan has submitted lowest bid for Summit ave. paving contract, giving price of $8,122 and naming Jamesville block. F. J. Baker submitted lowest asphalt bid, his figures being $8,386.20.

Akron, O.—Contract for the grading and paving of Kelly ave. from East Market st. to Cook st. bridge was awarded to E. McShaffrey & Son.

Cincinnati, O.—County Commissioners, Nov. 16, awarded contract for improving Cleves and Miamitown rd. to Nugent & Hines for $28,477.

Newark, O.—Board Public Service has awarded contract for paving with Bolen block portion of S. Pine st. at $6,300.

Guthrie, Okla.—Lincoln County Commissioners have let contract at Chandler for 31 miles of high surface highway, 10 to 14 ft. wide, to be constructed of rock and afterward oiled, to T. M. Steicher, a former good roads expert of the Federal Government, for $135,000.

Philadelphia, Pa.—Filbert Paving & Construction Co., city, has been awarded contract for work at Oceanside, a new seaside town, by the Oceanside Realty Co. at about $300,000; work includes grading of lots, putting down of water mains and sewer pipes, making streets and the construction of curbs and concrete sidewalks.

Philadelphia, Pa.—Proposals were opened by Assistant Director Knight, Nov. 23, for asphalt repaving work on number of streets, estimated to cost less than $50,000, as follows: Filbert Paving & Construction Co., $1.41 to $1.79 per sq. yd.; Mack Paving and Construction Co., $1.60 to $1.90 per sq. yd. Bids were ordered scheduled.

Fort Worth, Tex.—Texas Bitulithic Company has been awarded contract for paving College and Missouri aves., bitulithic to be the material used. Kuhleman & Blue Asphalt Company was also bidders, asphalt to be the material, but the price of $2.08¾ per sq. yd., submitted by Bitulithic Company, prevailed and they were accordingly awarded contract.

Salt Lake City, Utah.—Board of Public Works, Nov. 12, awarded contract for paving with asphalt Third South st. to Strange & Maguire, of Salt Lake City, for $147,852.

Auburn, N. Y.—Tabulation of bids for pavement and subway in Hoopes ave., received Nov. 16, by W. Thomas Wooley, City Engineer. Pavement awarded Brayer Bros., city, using Auburn gray limestone curb, for $8,899.50; the detailed bid follows:

3,020 sq. yds asphalt pavement, complete	$2.10
1,840 lin. ft. Auburn gray limestone curb'g	1.05
185 lin. ft. curved Auburn gray limestone curbing	1.50
1,840 lin. ft. Medina sandstone curbing	1.00
185 lin. ft. curved Medina sandstone curbing	1.50
2,025 lin. ft. concrete curb and gutter	.90
280 lin. ft. of limestone headers	.60
Price per cu. yd. for extra excavation	.80
Working days	60

SEWERAGE

Little Rock, Ark.—Consulting Engineer C. C. Brown, Indianapolis, has recommended that city construct sewer to convey effluent from all septic tanks in the southwestern part of the city to a point beyond city limits.

Alameda, Cal.—Council has decided to issue $30,000 bonds for intercepting sewer on South Side.

Los Angeles, Cal.—W. H. Humphreys, Board of Public Works, has estimated cost for construction of storm-drain sewer system at about $3,500,000.

Portersville, Cal.—Consulting Engineer G. L. Hoxie has prepared plans for laterals of the sewage disposal plant.

San Jose, Cal.—Council is considering construction of sewer in Thirteenth st.

Key West., Fla.—City desires correspondence with engineer relative to preliminary plans for contemplated city improvements, including sewerage.—I. N. Fogarty, Mayor.

Atlanta, Ga.—City has postponed date of election from December 15 to February 15, for voting on $1,250,000 bonds for sewage purification plant and $100,000 for lateral trunk sewer.—R. M. Clayton, City Engineer.

Aurora, Ill.—City Engineer Tarble has completed plans for the construction of the Pigeon Hill sewer; estimated cost, $100,000.

Berwyn, Ill.—Council has passed ordinances for construction of Oak Park ave. sewer and sewer on Morton ave.

Farmington, Ill.—Engineer Bates, Monmouth, has been selected to prepare plans for a sewer system.—H. C. Wilson, Secretary Board of Local Improvements.

Hillsboro, Ill.—Construction of sewer system is being considered.

Metropolis, Ill.—City proposes to construct sewer system; cost about $60,000.—J. T. Kimball, City Clerk.

St. Charles, Ill.—Engineer G. N. Lamb is preparing plans for general sewer system.

Springfield, Ill.—Board of Local Improvements has approved petition for sewer on South Seventh st.

Des Moines, Ia.—Bids will be received by Polk County Board of Commissioners about March 1 for constructing two tile drainage ditches, each 2 miles in length.—H. G. Curtis, County Surveyor.

Des Moines, Ia.—City Engineer John W. Budd will recommend reconstruction and extension of local sewerage system; cost, $150,000.

Fairfield, Ia.—Council will receive plans and specifications for sewer system; cost, $100,000.—W. L. Long, City Clerk.

Kinsley, Kan.—Construction of sewer system is being considered.

Georgetown, Ky.—Citizens have voted $5,000 storm-sewer bonds.

Mount Sterling, Ky.—Citizens have voted bonds for construction of sewer system.

Baltimore, Md.—City has decided to expend $22,600 in storm-water drains.—B. T. Fendall, City Engineer.

Haverhill, Mass.—Mayor Moulton is planning to build permanent sewers in Wards 5 and 6; cost $30,000.

Lawrence, Mass.—Bids will be called at once for construction of sewer on South Union st.

Detroit, Mich.—Plans are being prepared by City Engineer Robt. H. McCormick, 107 City Hall, for large sewer to connect Fairview ave. with Detroit river.—J. J. Haarer, Commissioner Public Works.

Grand Rapids, Mich.—Residents of Morris and College aves. will soon ask Aldermen to secure estimate of the cost of constructing sewers in these streets.

Chatfield, Minn.—City is considering installation of sewer system.

Fulda, Minn.—Plans are being prepared by L. P. Wolff, Engineer, St. Paul, for construction of sewer system.

Gulfport, Miss.—Citizens will vote on bonds for storm-sewer additions.—M. F. Sullivan, City Engineer.

Cameron, Mo.—Preliminary survey is now being made for the construction of tile pipe sewers.—Clarence Staples, City Clerk; W. S. Shields, of Chicago, Ill., Engineer.

Hermann, Mo.—Citizens have voted $10,500 bonds for construction of sewage disposal plant.

Vandalia, Mo.—Citizens have voted bonds for construction of a sewer system.

Webb City, Mo.—Plans have been submitted to Council for construction of the first storm sewer.

Falls City, Neb.—City Attorney J. E. Leyda is planning details of preliminary steps for construction of sewerage plant.

Madison, Neb.—Plans are being prepared by Engineers W. K. Palmer Co., Dwight Bldg., Kansas City, Mo., for pipe sewer, including two septic tanks; cost, $30,000.

Nebraska City, Neb.—Bids will be received by Board of Public Works, Dec. 1, for the construction of a sanitary sewerage system on the north side of city; cost, $11,000.

Beverly, N. J.—Citizens have defeated proposition to issue $60,000 bonds to install sewer system.

Paterson, N. J.—Freeholders will discuss construction of $40,000 drain sewer on Main st., between South First st. and the Wesel brook.

Plainfield, N. J.—Council will receive bids Dec. 10 for $43,000 bonds for sewer improvements.

Albany, N. Y.—Mayor Snyder has signed ordinance for extension of sewer from Ontario st.

Valley City, N. D.—City Engineer Crabbe, Fargo, has completed plans for sewer pipe and lift over river at the East Main st. bridge to give the county house sewer service.

Bellefontaine, O.—Board of Public Service is considering construction of sewer system and sewage disposal plant.—C. Inskeep, City Engineer.

Dayton, O.—Board of Service has asked bids for storm sewer on Richmond ave.

Jefferson, O.—Citizens will vote Dec. 14 on $20,000 bonds to erect and equip sanitary disposal plant for use of new sewerage system.

Sidney, O.—Board of Commissioners of Shelby County is preparing plans and will soon advertise for bids for 6,730 lin. ft. of 8 to 22-in. tile drain and 11,420 lin. ft. open ditch in Dinsmore Township.—W. A. Looker, Engineer.

Muskogee, Okla.—Council is considering construction of sewage disposal plant.—A. S. McGarr, Mayor.

Tulsa, Okla.—City proposes to expend about $65,000 for construction of brick and concrete sewers.—D. C. Fenstermaker, City Engineer.

Bedford, Pa.—Plans have been completed by Engineer C. E. Collins, Drexel Bldg., Philadelphia, for sewer system and disposal plant; bids will be invited next year.

Danville, Pa.—Engineer C. E. Collins, Drexel Bldg., Philadelphia, has prepared plans for sewer system and disposal plant; cost, $200,000.

McKeesport, Pa.—Council has approved action of Sewer Committee in rejecting all bids for employment of engineer to prepare plans for proposed new sewerage system with disposal plants and also concurred in Committee's action in authorizing Mayor and City Engineer to visit Harrisburg for purpose of holding a conference with Commissioner Dixon.

Norristown, Pa.—Bids will be received by State Hospital for the Insane in spring for construction of sewage disposal plant; cost, $35,000. Albright & Mebus, Engineers, Land Title Bldg., Philadelphia.—John West, Superintendent.

Pittsburg, Pa.—Council has authorized construction of sewer in 45th and Butler sts.; cost, $1,800.

Lincoln, R. I.—Prospect Hill Fire District is considering installation of sewerage system.

Aberdeen, S. D.—City has appropriated $25,000 for improving septic tanks.

Columbia, Tenn.—Walter G. Kirkpatrick, Jackson, Miss., has been selected to prepare preliminary plans for sanitary sewers.

Provo, Utah.—Council has decided to pass resolution creating sewer district No. 12, which includes nearly all west portion of the city; total cost is estimated at a little less than $80,000.

Spokane, Wash.—Board of Public Works has ordered plans for sewering Wall and Lincoln sts.

Tacoma, Wash.—Council has decided to construct sanitary sewer in improvement district No. 191; cost, $1,901.

Wenatchee, Wash.—City is considering installation of sewerage system; cost, $100,600.

Eau Claire, Wis.—Council has ordered 10-in. tile pipe sewer in Hobart st.

Waukesha, Wis.—City has rejected one bid received for construction of proposed sewer on State st. New bids will be called for.

Hamilton, Ont., Can.—Proposed West End sewer and disposal plant will cost about $110,000; bids for construction will soon be called.—H. E. Macallum, City Engineer.

London, Ont., Can.—Bylaw to raise $60,000 for construction of storm sewer will be submitted to the ratepayers at next election.

Subway Contract.—(A) The Safety Insulated Wire & Cable Co., N. Y., awarded contract at $3,381.20; (B) William P. Holihan, city, $3,433; (C) Brayer Brothers, city, $3,730.

	(A)	(B)	(C)
2,150 lin. ft. 4-duct tile, laid in place complete, including excavation and backfill, per duct ft.	$0.171	$0.19	.20
100 lin. ft. straight iron pipe laterals, laid in place complete, including excavation and backfill, per lin. ft.	.396	.40	.50
2,150 lin. ft. fiber duct laterals, laid in place complete, including specials, excavation and backfill, per lin. ft.	.26	.38	.40
40 iron pipe bends, in place complete, including material, excavation and backfill. Price each	2.80	3.00	3.50
4 double manholes, in place complete. Price each	300.00	270.00	240.00
Price per cu. yd. for excavation	1.00	.95	.80
Price per 1,000 for brick, laid in ¼ per cent. motar	14.00	17.50	16.50
Price per cu. yd. for 1–3–5 per cent. concrete, in place	6.50	9.00	8.00

BIDS RECEIVED AND CONTRACTS AWARDED

East San José, Cal.—The Town Trustees received bids from three firms for the construction of a drainage ditch on Chase ave. to relieve the eastern section of the town, and S. F. Bennett, the lowest bidder, was awarded the contract; the bids were as follows: San José Concrete Co., $1,375; James Casley, $1,250; S. F. Bennett, $975.

Highland Park, Ill.—E. R. Harding Co. has secured contract for constructing sewers in the southern portion of city, together with the sewage purification works, for $36,617.

Rock Island, Ill.—The Board of Local Improvements have let contract for constructing Sixth Ward sewer system to the People's Construction Co., of Rock Island, at the price of $47,583.50, the lowest bid; there were four other bids, as follows: Tri-City Construction Co., $49,780.65; P. F. Trenkenschuh, $51,210; Drainage Construction Co., of Chicago, $54,520, and G. F. Lambert, of Des Moines, $55,910.

Evansville, Ind.—Bids on three sewers were received by the Board of Public Works Nov. 20; on the Blackford ave. sewer the Newman Sewer Construction Co. bid $9,193.70 and John L. Newman $9,200.70; on the sewer in the alley between Monroe and Jackson aves., from Garvin st. east, Hughes & Co. bid 59c. per ft. for 12-in. pipe and 49c. for 10-in. pipe. On the sewer between Michigan and Virginia sts. Hughes & Co. bid 53c. for 10-in. pipe.

Long Branch, N. J.—John R. Jeffrey, Pearl st., South Elberon, has been awarded contract to build seven and one-half miles of sewer in West Grove by Township Committee of Neptune. Mr. Jeffrey's bid for doing the work is $32,885. There were seven bidders. The highest bid for doing the work was $37,778.35.

Fulton, N. Y.—Gansevoort st. sewer contract has been let to Samuel Bonn, who proved to be the only bidder when Board of Public Works opened bids for proposed improvement.

Troy, N. Y.—Board of Contract and Supply has awarded contract for construction of sewer in Pawling ave. from Ford ave. to the city line to the McDonough Construction Co. for $12,985, bids opened Nov. 9; work will include about 4.945 lin. ft. of 30, 21, 12 and 8-in. sewer.

Oklahoma City, Okla.—Following are bids opened Nov. 8 for construction storm sewers on (a) Broadway, (b) Walker ave.; J. O. Severns (a), $26,507; (b) $26,549. F. K. Stone (a), $32,983, (b) $27,968; H. B. Derr, (a) $30,429, (b) $31,275; W. T. McBride, (a) $47,937, (b) $44,316; Bouse & Bouse, (a) $38,065, (b) $36,219; Stokes & McCready, (a) $34,543, (b) $33,204; Rusco & Nixon, (a) $32,142, (b) $35,038; Tulsa E. & C. Co., (b) $30,128.

Franklin, Pa.—Bids for the building of the proposed sewer on Erie st., which will extend up Erie from Center about 720 ft., were opened and the contract was awarded to F. T. Sutley, the lowest bidder; the following were the bids submitted: Northwestern Construction Co., $461; John E. Ritchey, $604.60; Amsler & Co., $559.20; F. T. Sutley, $420.

Meadville, Pa.—Tony Caravella has been awarded contract for constructing sewers in Clark and Porter sts.

Mitchell, S. D.—Contract for constructing lateral sewers, bids opened Nov. 15, has been awarded to J. J. Dunnegan, of Shenandoah, Ia., for $10,507.—L. L. Ness, City Auditor.

Laredo, Tex.—A. Dentz & Bro., city, has secured contract for a 24-in. pipe sewer for $7,000, bids opened Nov. 10.—A. V. Woodman, City Secretary.

Salt Lake City, Utah.—The Board of Public Works has turned down the bid of McKay & Read for the reinforced concrete weir in Parley's Creek at 12th South st. because it was too high; the bid was $6,742.60 with the riprapping and $995 less for concrete aprons to the weir, which was about $2,000 less than the bid of Zerbe & Walker for the same work several weeks ago. City Engineer George O. Chaney, however, believes the work can be done for at least $3,500. The Board will probably let the weir alone this winter and fix it next spring.

Ft. Worden, Wash.—Bids were opened Oct. 22 by Capt. E. C. Long, Constructing Quartermaster, U. S. A., 482 Arcade Annex, Seattle, Wash., for constructing a sewer system, and contract has been awarded to P. M. and J. H. Coyne, Port Townsend, for $8,000.

Montreal, Que., Can.—Henault & Hefferman, 24 St. Famille st., have been awarded contract for the 5-ft. circular sewer at $25,266; other tenders were as follows: Gilbert & Toussaint, $28,988.25; Canadian General Developing Co., $33,307.50; L. Gignere & Co., $28,987.50; M. Lapointe, $32,476.50; M. Dineen, $25,474.50; John Leahy & Co., $32,827.50; Michael Maisan & Co., $26,769.50; Decarie & Taillefer, $25,488.75.

WATER SUPPLY

Cushing, Ark.—Citizens voted in favor of issuing bonds for water works system.

Jonesboro, Ark.—Craighead County Well Co. has been incorporated with $2,000 capital stock.—George C. Peters, President.

Murfreesboro, Ark.—Pike County Water Works Co. has selected Engineers Fuller & Coult, Chemical Bldg., St. Louis, Mo., to prepare plans for system of water works; cost, $600,000.

Fayetteville, Cal.—Council has passed an ordinance providing for extension and improvement of water works system; work includes installation of auxiliary pumping station; cost, $3,000.

San Diego, Cal.—City will rebuild Point Loma reservoir.—J. T. Butler, City Clerk.

San Francisco, Cal.—Board of Supervisors has passed ordinance calling special election Dec. 28, to decide question of authorization of $45,000,000 bonds for acquisition of municipal water supply, source of which shall be Lake Eleanor and waters of the Tuolumne River.

Sonora, Cal.—Citizens have defeated proposed $75,000 bond issue for installation of municipal water supply and high pressure fire system.

Littleton, Colo.—P. G. Kennedy, Denver, has filed maps for Lone Tree Reservoir, which he proposes to construct in Arapahoe County; dam will be 50 ft. high, and water will be taken from Toll Gate Creek; reservoir will have a capacity of 149,350,400 cu. ft.; cost, about $88,000.

Pueblo, Colo.—E. F. Rizer, Pueblo, has filed maps and descriptions of proposed reservoir to be constructed in Pueblo County at a cost of $128,000; water is to be taken from Rush Creek.

Marianna, Fla.—Citizens will vote on $10,000 bonds for consolidation and improvement of water works and electric light plant.

Atlanta, Ga.—City has postponed date of election from December 15 to February 15 for voting on issuance of $900,000 water works bonds.—R. M. Clayton, City Engineer.

Story City, Ia.—City is considering installation of meters.

Woodbine, Ia.—City is considering drilling of deep wells.

Erie, Kan.—Bids will be received about Dec. 15 for construction of water works and an electric light plant from plans of Burns and McDonnell, Scarritt Bldg., Kansas City, Mo.; probable cost, $50,000.—J. C. Demous, City Clerk.

Murray, Ky.—Bids will be received Dec. 17 for $23,000 water works and electric light bonds.—Jos. T. Parker, City Clerk.

Mount Washington, Md.—Mount Washington Water Works Co. will issue $25,000 bonds for improving and extending water works.

Warren, Mass.—Citizens are advocating installation of water works system to replace present aqueduct supply.

West Bridgewater, Mass.—Citizens are considering securing of water supply system.

Marquette, Mich.—Commission proposes to extend the intake about 3,000 ft. further into lake.—J. P. Kern, Secretary.

Delano, Minn.—Citizens have voted to issue bonds for erection of new tower and water tank.

Gilbert, Minn.—City will install mains at once in Sparta addition; cost $55,000.

Vaiden, Miss.—Citizens have voted $21,000 bonds to install water works.

Vicksburg, Miss.—City is considering construction of water works.

Columbia, Mo.—City is considering bond issue for betterment of water plant.—John S. Bicknell, City Clerk.

Springfield, Mo.—Water works system will be improved.—H. B. McDaniel, Managing Director.

Vandalia, Mo.—Citizens have voted $25,000 bonds for construction of water works and sewer systems.—Fuller-Coult Co., Chemical Bldg., St. Louis, Engineers.

Conrad, Mont.—C. T. Sacker and C. D. Flaherty, Livingston, are preparing plans for water works and electric light plant.

Great Falls, Mont.—Council is considering construction of water pumping plant.

Milford, Neb.—Village will vote Dec. 14 on $12,500 bonds for installation of water system.

Oconto, Neb.—Citizens have defeated proposition to issue $7,500 bonds for construction of water works system.

Ventnor, N. J.—Bids will be advertised by City Clerk Steelman for 70,000 gallon reservoir.

Geneva, N. Y.—Board of Public Works has ordered extension of water main in Angelo st.; cost $5,000.

Newburgh, N. Y.—Water Board is considing purchase of extra pump for use at Washington Lake as an auxiliary.—Wm. W. Hawks, President Water Board; Curtis Stanton, Superintendent.

Dayton, O.—Belmont Improvement Association has recommended purchase of another double-action force pump with added equipment for fire protection.

Westerville, O.—Council is considering ordinance granting Municipal Utilities Co., Columbus, 25-year franchise for constructing and operating water and light plant; if ordinance is finally passed company will expend $23,500 in improvements.

Chickasha, Okla.—Bids will be received Dec. 2, 2 p. m., for furnishing 168 lin. ft. 14-in., 336 lin. ft. 12-in., 4,610 lin. ft. 8-in. and 60,928 lin. ft. 6-in. c. i. water pipe, class "B," approximately 1,150 tons; also following special castings; One hundred and forty-one 6-in. T's; nineteen 6-in. crosses; one 8-in. by 6-in. cross; twenty 8-in. by 6-in. T's; thirty 6-in. plugs; ten 8-in. plugs; one 8-in. by 6-in. reducer and two 14-in.; 450 bends; 138 double nozzle hydrants, 4-in. V. O.; forty-five 6-in. valves; three 8-in. valves and 20 valve boxes.—Jos. Dews, City Clerk; E. A. Peyton, Water Superintendent.

El Reno, Okla.—Citizens will vote Dec. 21 on $10,000 bonds for construction of water works.—Burns & McDonnell, Scarritt Bldg., Kansas City, Mo., Engineers.

Ramona, Okla.—Construction of water works to cost $18,000 is being considered.—C. E. Menzie, Chairman Board Trustees.

Vinita, Okla.—Plans for water works system are being prepared by Caton & Hockbusch, Muskogee, Engineers.

Gervais, Ore.—City will install $2,000 water pressure system.

Portland, Ore.—City is having plans prepared by Engineer Clarke, Water Department, for second Bull Run pipe line; $3,000,000 is available.

Carbondale, Pa.—Council has finally passed ordinance granting franchise to Pioneer City Water Co.

Franklin, Pa.—City will construct 10-in. main from pump station to the largest tank on Galena Hill; cost $4,000.

Ridgway, Pa.—Buffalo, Rochester & Pittsburg Railway Co. has decided to build reservoir to supply its water tanks at Clarion Junction; dam will be 500 ft. long and 50 ft. high, and will back water for almost a half mile.—E. F. Robinson, Rochester, N. Y., Chief Engineer.

Lexington, S. C.—Citizens have defeated $15,000 bond issue for construction of water works.

Rock Hill, S. C.—Rock Hill Water & Electric Co. has been incorporated with a capital of $100,000 to operate water works and an electric light and power plant.—A. P. Maloney, President.

Rock Hill, S. C.—City proposes to vote on $150,000 bond issue for water works.

Center, Tex.—Citizens have voted bond issue for extension and improvement of water works.

Clarendon, Tex.—Clarendon water works & Light Co. will make improvements to plant.

Dallas, Tex.—Bronx Park Water Co. has been incorporated by Eli Sanger, Samuel E. Milliken and Israel Dreeben; capital $10,000.

Donna, Tex.—City will construct a water works system.

Jacksonville, Tex.—City is considering election on $8,000 bond issuance for extension of water system.

McAllen, Tex.—R. S. Pershing, McAllen Ice & Power Co., McAllen, Tex., will purchase deep well pump to raise water 70 ft., about 60 gallons per minute.

Aberdeen, Wash.—Installation of storage reservoir is being considered.

Conconully, Wash.—City will construct water works at a cost of about $5,000; contracts will be let in about three months.—A. P. Wheeler, Engineer; F. R. Weeks, Town Clerk.

Puyallup, Wash.—Council is considering installation of meter system throughout city.

Toronto, Ont., Can.—Board of Control is considering the installation of 11,137 ft. of new water main with 36 hydrants.

Oaxaca, Mex.—R. Pimental, Engineer, has prepared plans for large concrete dam; cost $20,000.

BIDS RECEIVED AND CONTRACTS AWARDED

Mobile, Ala.—Bids for work on the sluiceway at the city pumping station at Spring Hill were received and Mosaic Flooring Works was low at $5,450 and secured work; the bid of Jett Bros. was withdrawn and the bid of E. Ward & Co. was $9,635.

Dumas, Ark.—P. H. Porter, Clinton, Ky., for a lump sum of $5,800 has been awarded contract for furnishing and laying 4,000 ft. of 2-in. galvanized iron pipe in 2-ft. trench with ¾ x 2-in. T every 50 ft. at 25c.; 6,000 ft. 4-in. c. i pipe, Class B, in 2 ft. trench, 50c.; 4 valves and boxes, 4-in., 150 lbs. pressure, at $8 each; 8 valves and boxes, 2-in., at $5 each; 34 Corey hydrants, with 4-in. connection, and two 2½-in. nozzles in 2-ft. trench, $24 each; building frame

pumphouse, 18 ft. by 24 ft., cover, floor, sealed throughout; deep well pump for 6-in. casing complete with powerhead, in place and fully connected up; placing 4-in. riser pipe to 75-ft. tank, in place. M. B. Sanders, of Little Rock, also bid.

Contract was awarded to G. F. Halloway for 6-in. well, cased with standard pipe; 6-in. strainer for 200 ft. or less, $800; extra depth to 800 ft., $4 per ft. A. K. Wallin also bid.—Alfred M. Lund, Lund & Hill, Engineers, Little Rock, Ark.

Rock Island, Ill.—The Board of Local Improvements let the contract for a 6-in. water main on 8½ ave. and for a sewer on 34th st. to P. F. Trenkenschuh.

Holyoke, Mass.—Sullivan and Carmody were awarded the contract for furnishing two carloads of pipe by Board of Public Works; this firm bid 72 per cent of list price; the other two bids were at 71.2 and 70 per cent of list price.

New Bedford, Mass.—The Darling Pump & Mfg. Co., Williamsport, Pa., has been awarded contract for supplying valves to Water Board; bids containing reservations as given last week were not considered.

Gilbert, Minn.—The contract for installing water works system has been let to the H. L. Barrett Co., of Virginia; City Engineer Frank A. Bowman is laying out the lines for them.

Brooklyn, N. Y.—Bids were opened Nov. 17 by Commissioner of Water Supply, Gas and Electricity for furnishing, delivering and laying trunk distributing main and appurtenances in Albany, Clarkson, Woodruff, Ocean, Caton, Coney Island, Church and 14th aves., and in 50th st., Borough of Brooklyn; two bids were received for this work; one called for c.-i. pipe and the other for lock bar type of steel pipe.

Cast-Iron Pipe: Lowest bidder Robt. Carter Co., Brooklyn, at a total of $267,934, including pipe, hydrants, valves, etc. Some of the principal items in this bid are as follows: 6,200 tons straight c. i. pipe, $33; 175 tons c. i. special castings, $55; 30 tons c. i. castings, $55; 16,200 lin. ft. 48-in. c. i. pipe, $1.82; 50 lin. ft. 36-in. c. i. pipe, $5; 50 lin. ft. 30-in. c. i. pipe, $5; 4,200 lin. ft. 20-in. c. i. pipe, 80c.; 2,000 lin. ft. 16-in. pipe, 65c.; 200 lin. ft. 12-in. pipe, 45c.; 1,200 lin. ft. 8-in. pipe, 45c.; 300 lin. ft. 6-in. pipe, 45c.; 60 cu. yds. brick masonry, $10; 60 cu. yds. concrete masonry, $7; 6,000 lbs. wrought iron and steel, 5c.; 6,000 sq. yds. macadam, 25c.; 2,200 sq. yds. asphalt, 50c.; 1,500 cu. yds. extra excavation, $1; 1,000 lin. ft. vit. or cement sewer pipe, 3 to 15-in. diam., 50c. Totals of other bids: F. V. Smith Contracting Co., 147 E. 125th st., New York City, $307,700; J. C. Rodgers, Jr., 121 W. 125th st., New York City, $303,137; M. J. Dady, Brooklyn, N. Y., $304,072.

Lock Bar Steel Pipe: Lowest bidder, M. J. Dady, Brooklyn, at a total of $264,597, including hydrants, valves, etc. Some of the principal items in this bid are as follows: 16,200 lin. ft. 48-in. straight pipe, $13.93; 550 tons straight c. i. pipe, $28; 35 tons c. i. special castings, $59; 30 tons c. i. castings, $49; 50 lin. ft. 36-in. c. i. pipe, $6; 50 lin. ft. 30-in. c. i. pipe, $4; 420 lin. ft. 20-in. c. i. pipe, $2.50; 2,000 lin. ft. 16-in. c. i. pipe, $1.50; 200 lin. ft. 12-in. c. i. pipe, $1.25; 1,200 lin. ft. 8-in. c. i. pipe, $1; 300 lin. ft. 6-in. c. i. pipe, 75c.; 60 cu. yds. brick masonry, $20; 60 cu. yds. concrete masonry, $8; 20 M ft. timber and lumber, $40; 6,000 lbs. wrought iron and steel, 4½c., 6,000 sq. yds. macadam, $1.20; 2,200 sq. yds. asphalt pavement, $2.40; 1,500 cu. yds. extra excavation, $1; 100 cu. yds. rock excavation, $5; 1,000 lin. ft. vit. pipe, 3 to 15-in. diam., $1. Totals of other bids: Rodgers & Hagerty, 41 Park Row, New York City, $275,519; Harlem River Contracting Co., 21 Park Row, New York City, $273,305; J. C. Rodgers, Jr., 121 W. 125th st., New York City, $288,687; Cooper & Evans Co., 220 Broadway, New York City, $303,138, riveted steel pipe.

Bids were also opened same time and place as above for furnishing, delivering and laying a trunk distribution main and appurtenances in Glenmore, Pennsylvania and Bushwick aves., and in Madison st., Borough of Brooklyn; two bids were also called for on this contract—cast-iron pipe, and steel pipe, lock bar.

Cast-iron pipe: Lowest bidder, J. H. Holmes, Fulton st., Brooklyn, at a total of $389,725, including valves, hydrants, etc. Some of the principal items in this bid are as follows: 8,200 tons straight pipe, 6-in., $28; 200 tons c. i. special castings, $70; 30 tons c. i. castings, $50; 18,800 lin. ft. 48-in. pipe, $3.25; 3,400 lin. ft. 36-in. pipe, $2; 3,400 lin. ft. 30-in., $2; 2,500 lin. ft. 24-in., $2; 100 lin. ft. 20-in., $1; 900 lin. ft. 16-in., $1; 200 lin. ft. 12-in., $1; 100 lin. ft. 8-in., $1; 700 lin. ft. 6-in., $1; 200 cu. yds. brick masonry, $12; 200 cu. yds. concrete masonry, $7; 25 M ft. timber and lumber, $20; 10,000 lbs. wrought iron and steel, 5c.; 200 sq. yds. granite block pavement, $2.50; 500 sq. yds. macadam, 40c.; 16,000 sq. yds. asphalt, $2.25; 1,500 sq. yds. asphalt block pavement, $2; 3,000 sq. yds. extra excavation, $1; 200 cu. yds. rock excavation, $3; 2,000 lin. ft. vit. or cement pipe sewer, 3 to 15-in. diam., 50c. Totals of other bids: F. V. Smith Contracting Co., 147 E. 125th st., New York City, $435,900, and J. C. Rodgers, Jr., 121 W. 125th st., New York City, $440,039.

Steel pipe, lock bar: Lowest bidder, Harlem River Construction Co., 21 Park Row, New York City, at a total of $414,950, including valves, etc. Some of the principal items in this bid were as follows: 18,800 lin. ft. 48-in. straight pipe, etc., $14; 1,700 tons straight c. i. pipe, $35; 100 tons c. i. special castings, $65; 30 tons c. i. castings, $50;4,300 lin. ft. 36-in. c. i. pipe, $3; 3,400 lin. ft. 30-in., $2.50; 2,500 lin. ft. 24-in., $2; 100 lin. ft. 20-in., 80c.; 900 lin. ft. 16-in., 70c.; 200 lin. ft. 12-in., 70c.; 100 lin. ft. 8-in., 50c.; 700 lin. ft. 6-in., $1; 200 cu. yds. brick masonry, $8; 200 cu. yds. concrete masonry, $5; 25 M ft. timber and lumber, $50; 10,000 lbs. wrought iron and steel, 3c.; 200 sq. yds. granite block pavement, $1.60; 500 sq. yds. macadam pavement, 50c.; 16,000 sq. yds. asphalt pavement, $3; 1,500 sq. yds. asphalt block pavement, $1.50; 3,000 cu. yds. extra excavation, $2; 200 cu. yds. rock excavation, $5; 2,000 lin. ft. vit. or cement pipe, 3 to 15-in. diam., $1. Totals of other bids: Rodgers & Hagerty, 41 Park Row, $418,235, and J. C. Rodgers, Jr., 121 W. 125th st., $430,639.

Rochester, N. Y.—Lowest bid opened Nov. 17 by State Commission in Lunacy at Albany for rearrangement of water piping for fire service, Rochester State Hospital, was that of R. T. Ford Co., city, at $3,700.

White Plains, N. Y.—Contract for constructing a steel water tower, bids opened Nov. 22, has been awarded to Des Moines Bridge & Iron Works, of Des Moines, Ia., for $8,360.—J. E. Heeney, Superintendent Water Works.

Cincinnati, O.—Bids were opened Nov. 15 by Lieut.-Col. J. G. Warren, Corps Engineers, U. S. A., for installing water works at Dam 37, Ohio River, and the G. & W. Mfg. Co., New York, N. Y., bid for work complete $8,830; Horace E. Horton, Chicago, Ill., bid for a portion of the work $2,631.

Portland, Ore.—Crane Co., Chicago, Ill., has secured contract for sleeves and valves for $5,600.

Providence, R. I.—Board of Contract and Supply, Nov. 19, awarded contracts for six centrifugal pumps and appurtenances to be installed at pumping station at Field's Point to Providence Engineering Co. for $26,500.

Dallas, Tex.—Following are the bids opened Nov. 10 by Board of City Commissioners for a 15,000,000-gal. pump for the White Rock water reservoir: Bethlehem Steel Co., $81,700; Allis-Chalmers Co., $82,737 on a 48-in. pump and $78,235 on a 42-in. pump; A. M. Lockett Co., $85,000; Wm. Tod Co., $69,700 on a 42-in. small plunger pump and $75,000 on a 48-in. pump and $76,500 on a 42-in. large plunger; Camden Iron Works, $82,500;

Richmond, Va.—Bids were opened Nov. 15 for a pipe line for drainage of the coagulating tanks at settling basin, and contract awarded to Hunter B. Frischkorn for $1,268, and for a gasoline engine for flushing the basins to the Smith-Courtney Co. for $1,536.

Spokane, Wash.—Allis-Chalmers Co., Milwaukee, Wis., was awarded contract by city for furnishing three 7,500,000-gal, multi-stage centrifugal pumps and three induction pumps, switchboard and connection for $33,904.

Spokane, Wash.—Bids were opened Nov. 15 by Board of Public Works for new mains for the water extension as follows: Union Iron Works, of Spokane, $96,000, and the Jas. McNeil & Bros. Co., Pittsburg, $140,000.

Milwaukee, Wis.—Following are the bids opened by Board of Public Works Nov. 16 for furnishing and installing at North Point Pumping Station on shore Lake Michigan near North ave. a pumping engine: Wisconsin Engine Co., Corliss, Wis., $83,000; Allis-Chalmers Co., West Allis, $64,300; Wm. Tod Co., Youngstown, O., $78,000, and Bethlehem Steel Co., South Bethlehem, Pa., $90,500.—C. J. Poetsch, Chairman.

LIGHTING AND POWER

Gurley, Ala.—Gurley Light & Power Co. has been granted franchise to erect electric light plant and has secured a contract to furnish electricity to light streets.

Nashville, Ark.—B. H. Rainwater, Junction City, is interested in installation of electric light plant.

Alturas, Cal.—I. W. Gibbins has filed water rights for hydroelectric power plant on Silver Creek in Warner Mountains; proposed plant will be capable of developing 4,000 h.p.

Porterville, Cal.—S. E. Henley will construct power plant from plans of Holley & Holley, Visalia; cost $150,000.

San Bernardino, Cal.—Plans are under way for construction of the immense central gas plant, by San Bernardino Valley Gas Co., which recently absorbed Home Gas Co. of this city, Redlands Gas Co.'s and the Colton Gas Co.; scheme involves building of great central plant at Colton from which will be distributed gas to various cities and towns; work will begin about first of year and it will cost about $200,000.

Visalia, Cal.—Mt. Whitney Power & Electric Co. has been incorporated by John C. Hays, Thos. J. Broidrick and Harry T. Hays, of Visalia, and Allen C. Chickering, Oakland; capital $5,000,000.

Boulder, Col.—The City Council has appropriated $40,000 for construction of hydroelectric power plant in connection with city water system, in accordance with plans prepared by Prof. H. S. Evans, of the State University; City Engineer has been instructed to make surveys; project includes utilizing a pipe line which supplies city with water from Silver Lake for generation of power.

South Coventry, Conn.—Rockville-Willimantic Lighting Co. is considering construction of transformer for distribution of electricity for lamps and motors.

Washington, D. C.—Electrical Engineer W. C. Allen has recommended improvement in lighting of certain business thoroughfares, also of streets in residential district which are used for traffic during night.

Marianna, Fla.—Citizens will vote on $10,000 bonds for consolidation and improvement of electric light plant and water works.

La Fayette, Ga.—Citizens will vote Dec. 15 on $12,000 bonds for construction of electric light plant.

Wallace, Ida.—Edw. Donlon, Missoula, Mont., has decided to construct power plant at Thompson Falls, to deliver electric power to this city; cost $1,000,000.

Watertown, Ill.—Village Board has granted 25-year franchise to the United Light & Power Co. to furnish electricity for lamps.

Brook, Ind.—Newton County Commissioners have granted to Cragg Brothers franchise to erect and operate transmission lines on county roads between Brook, Morocco and Foreman.

Greenfield, Ind.—Southern Indiana Gas Co. will ask city for franchise for manufactured gas, it being intention to supply this and other cities with artificial gas from large plant at Anderson when natural supply is exhausted.

Thurman, Ia.—Electric light company at Malvern proposes to build from Tabor down, if people of Thurman enter into contract to take thirty 40-c.p. lamps on streets, at $1.25 per month each, giving company 20-year franchise, business men to take lights, people of Thurman to loan company $5,000 on mortgage bonds.

Hill City, Kan.—Construction of a municipal electric light plant is being considered.

Salina, Kan.—People's Light, Heat &

Portland, Ore.—Recapitulation of bids, steel pipe for connecting mains, reservoirs Nos. 5 and 6, opened by Water Board, Nov. 9. D. D. Clarke, Engineer: (A) East Jersey Pipe Co., 90 West st., New York, $40,071.50;delivery begins in 60 days; complete, Feb. 2, 1910, $44,078.25. Based on completing shipment, 45 days. (B) Riter-Conley Manufacturing Co., Pittsburg, Pa., $41,730.55; delivery begins in 75 days; complete April 1, 1910. (C) Schaw-Batcher Co. Pipe Works, Sacramento, Cal., $45,440; begin 60 days; complete March 10, 1910. (D) The Petroleum Iron Works Co., Pittsburg, Pa., $45,944.25; begin 90 days; complete April 15, 1910. (E) Jas. McNeil & Bro. Company, Pittsburg, Pa., $48,147; begin 60 days; complete March 15, 1910. (F) Marine Iron Works, St. John, Ore., $48,938.90; complete July 1, 1910; includes use of Pioneer Mineral Rubber dip; also 6 manholes free; above this amount, $18.50 each.

	(A)	(B)	(C)	(D)	(E)	(F)
1,500 lin. ft. 48 x 5/16″ straight pipe	$6.35	$7.02	$7.75	$7.60	$7.30	$8.20
65 lin. ft. 48 x 5/16″ curved pipe	6.35	8.80	11.50	9.75	12.50	24.60
420 lin. ft. 36 x ¼″ straight pipe	4.20	4.50	4.75	4.70	5.00	4.87
25 lin. ft. 36 x ¼″ curved pipe	4.20	6.30	7.00	6.15	9.00	14.61
6,000 lin. ft. 30 x ¼″ straight pipe	3.65	3.65	4.00	4.10	4.30	4.05
115 lin. ft. 30 x ¼″ curved pipe	3.65	5.25	6.00	5.35	7.50	12.30
1,680 lin. ft. 24 x ¼″ straight pipe	3.00	3.20	3.12½	3.45	3.70	3.35
35 lin. ft. 24 x ¼″ curved pipe	3.00	5.00	4.50	4.90	6.60	10.05
10,000 lbs. specials—¼″ plate	.08	5.54	.08	.06	.095	9.35

Power Co. has asked for extension of five years on present franchise; company proposes to double size of plant.

Murray, Ky.—Bids will be received Dec. 17 for $23,000 electric light and water bonds.—Jos. T. Parker, City Clerk.

Baton Rouge, La.—Local gas company plans to lay 5 miles of mains through city.

Springfield, Mass.—Street Lighting Committee will install 25 arc lights on Main st.

Buffalo, Mo.—Big Naungua Power Co. is considering construction of hydroelectric plant.

Columbia, Mo.—City is considering bond issue for betterment of light plant.—John S. Bicknell, City Clerk.

Princeton, N. J.—Borough authorities are considering adequate lighting of borough; municipal ownership is also under consideration; Lighting Committee will report on more efficient system.—Professor Howard McClenahan, Princeton University, Consulting Engineer.

Camillus, N. Y.—Town Board has granted franchise to Moritz Mayer, Syracuse, to erect transmission line from substation of Niagara Falls transmission lines at Solvay to village.

Apex, N. C.—Town has granted 20-year franchise to A. J. Martin to build and to operate electric plant; plant is to be installed by Jan. 1.

Franklin, N. C.—Henry O. Cozad will construct electric light plant.

Ambrose, N. D.—Aug. Engstrand has petitioned Council for franchise for electric light plant.

Defiance, O.—Council is considering gas and electric contract problems; only company in field, Defiance Gas & Electric Co., has refused to bid as city wants $1 gas and 8c. per kilowatt electricity.

Westerville, O.—Ordinance has been introduced in Council granting to Municipal Utilities Co., Columbus, 25-year franchise for constructing and operating light and water plant; if this ordinance is finally passed company will practically reconstruct municipal water and light plant at cost of $23,500; power for plant will then be secured from the C., D. & M., four miles away.

Altus, Okla.—Plans are being prepared for extensions to municipal electric system; cost $35,000; election will soon be called to vote on proposition.

Forest Grove, Ore.—Franchise has been granted to A. Welch to furnish all-night electric street lighting service for this city.

Boyertown, Pa.—Local electric light company will light streets of Gilbertsville with nine street lights.

Chambersburg, Pa.—Council has voted to ask for bids for improvements to electric light plant.—J. H. Mowry, Superintendent Electric Light Plant.

York, Pa.—Councils have instructed their Light Committee to ask bids for municipal lighting plant as result of presentation by Edison Company of bid for lighting next year in excess of the appropriation; Edison's bid was the only one received; new plant will cost about $200,000.

Rock Hill, S. C.—Citizens will vote on $35,000 bonds for electric lighting plant.

Arlington, S. D.—Council is estimating cost of installation of electric light plant; cost from $2,500 to $3,000.

Angleton, Tex.—E. M. Masterson will at once erect electric light and ice plant.

Bellville, Tex.—D. Wilrodt is interested in construction of electric light plant.

Clarendon, Tex.—Clarendon Water Works & Light Co. will make improvements to plant.

Port Arthur, Tex.—Port Arthur Traction Co. will erect power house and car barns on Houston ave.

San Antonio, Tex.—Ira C. Rinehart, President Germania Bank & Trust Co., is interested in company which will furnish light and power from established plant; contemplates applying for franchise, and later may construct plant; cost $150,000.

Salt Lake City, Utah.—Application has been filed with State Engineer by C. J. Petgen, of Pittsburg, Pa., for right to appropriate ten second feet of water from the Cottonwood Creek, in Piute County, to generate electrical power for mining.

Pulaski, Va.—Bids will be received for new and second-hand guaranteed machinery as follows: One 200-h.p. tubular boiler, complete; one 150-h.p. horizontal engine, suitable for direct-connection to 100-k.w. alternator, r.p.m. 275; one 100-k.w. alternator, 3-phase, 60-cycle, 275 r.p.m.; one 75-k.w. alternator, 3-phase, 60-cycle, 270 r.p.m.; six 5-k.w. transformers, 60-cycle; a switchboard, suitable for above alternators. —S. S. Wall, Superintendent City Light Plant.

Richmond, Va.—Plans of E. W. Trafford, Chamber of Commerce Bldg., have been approved for transmission line to carry current from new electric plant to the pumps recently installed at the new pump house on the upper river; contracts for same will be let at once.—E. B. Richardson, Chairman Committee on Electricity.

Richmond, Va.—Finance Committee has recommended to Council supplemental appropriation of $65,000 for construction of the distribution system in connection with proposed new electric light plant.

Chehalis, Wash.—W. W. Seymour, of Tacoma, has filed his acceptance of gas franchise that was recently granted him by Council.

Mabton, Wash.—Council has granted Yakima Valley Power Co. 15-year franchise to install electric light plant.

Spokane, Wash.—City has awarded $500,000 water extension bonds to Harris Trust & Savings Bank, E. H. Rollins & Co. and others.

Tacoma, Wash.—City Electrician F. H. Lauzon has prepared two estimates of cost of removing poles from Pacific ave. and C st. and replacing them with cluster lights with the wires in conduits either under the roadways or under the sidewalks; with conduits under roadway on Pacific ave. it will cost $45,266 to remove the wooden poles and replace them with ornamental cluster light poles, improvement to affect Pacific ave from South 24th st. to South 7th st.; for this work 7,115 ft. of main line or conduits is required, according to estimate; will also need 5,000 ft. of service conduits and 124 new lamp posts; C st. work, with conduits under roadway, will cost $24,719; both the above estimates provide for lamps on Jefferson ave, from Pacific ave. to C st.; with conduits under sidewalks Pacific ave. job will cost $41,297; difference is because of the different manner of wiring; C st. job, with conduits under sidewalks, amounts to $22,379.

Tacoma, Wash.—Fire and Water Committee has ordered bids advertised for $25,000 worth of incandescent lamps.

Bluefield, W. Va.—C. W. Akers, G. T. Epling, P. J. McElrath, P. J. Kelly, Joseph M. Sanders, Earl Riley, R. M. Garrett and W. J. Jenks have applied for franchise to establish gas plant.

Basin City, Wyo.—Council has decided to call election on proposition to purchase electric plant of the Wyoming Electric Light & Power Co., to be owned and operated by municipality.

Swamp River, Man., Can.—Ratepayers have voted $15,000 bonds; proceeds will be used to purchase lighting plant, fire engine and to make improvements.

BIDS RECEIVED AND CONTRACTS AWARDED

Meridian, Cal.—The Trustees of Reclamation District No. 70 received four bids for installing motor power for the seepage water pump in the district as follows: E. Schmidt and J. H. Head, of the Sampson Iron Works, of Stockton; C. M. Blivin, of the General Electric Co., of San Francisco; J. W. White, of the Fort Wayne Electrical Works, and C. F. Renter, of Fairbanks, Morse & Co., of San Francisco. The last-named firm was given the contract to install a 150-h.p. motor with complete electrical equipment, and a 30-in. pump, to be ready for operation by Jan. 15, 1910.

Orange, N. J.—Council has awarded contract for the municipal lighting plant and system to Storms & Co., of Newark, that concern being the lowest of a number of contractors who submitted estimates a few weeks ago. The total amount of the Storms bid is $82,939, without the underground distributing system in Main st., the Street Committee recommending that this additional expense would be unwarranted. The contract was awarded subject to the issue of bonds for $90,000, at 4 per cent, this amount being estimated as necessary to cover every item of expense connected with the completing of the lighting system.

West Hoboken, N. J.—Board of Council has awarded public lighting to Public Service Corporation for $85 per arc light; this represents a reduction of $15 per light from price heretofore paid by town.

Roxboro, N. C.—J. Maxwell, of General Electric Co., Baltimore, Md., has secured contract to construct municipal electric light plant.

Franklin, Pa.—A bid by the Franklin Electrical Co. to place ten 32-c.p. Tungsten lights in the alleys on Liberty st., between 12th and 13th, for $21 per year each, was referred to the Light Committee and bid to place twelve 10-c.p. lights in the city park for $7.20 per month was accepted.

York, Pa.—The Edison Electric Light Co. has submitted a bid for lighting the streets with arc lights for $60 per year and furnishing current for other purposes for 10c. per k.w. hour.

Milbank, S. D.—Minneapolis Steel & Machinery Co. has been awarded contract for furnishing one Muenzel producer-gas engine and gas producer plant for electric light plant, which is owned by Oscar Claussen, Consulting Engineer, St. Paul, Minn.

Fort Douglas, Utah.—Contracts aggregating $27,242.06 have been let for replacing present oil lamps with complete electric lighting system for post, as follows: Salt Lake Electric Supply Co., construction of the power transmission line and feed wires through the post, $11,749; construction of transmission substation building, $2,009.50; Meteor Electric Co., Salt Lake, wiring buildings and installing fixtures, $9,418.56; F. E. Newberry & Co., St. Louis, transformers and equipment for substation, $4,065. Current will be purchased from the Utah Light & Railway Co., and will be distributed over the reservation via the post substation.

FIRE EQUIPMENT

Fresno, Cal.—Chief Wintermute has recommended repair of engine house No. 1.

Irvington, Cal.—Ladies' Improvement Association is securing funds for purchase of chemical fire engine and other apparatus.

Oakland, Cal.—Preliminary steps toward extending fire and police protection to the newly annexed districts of Oakland have been taken by Mayor Mott.

Oakland, Cal.—Citizens have voted $80,000 bonds for new building for fire and police department.

Oakland, Cal.—Piedmont Improvement Club, Piedmont, is discussing advisability of issuing bonds for purchase of automobile fire engine, chemical and hose wagon combined, and to provide money for constructing engine house.

Danielson, Conn.—Pioneer Hose Co. is planning to purchase new hose wagon.

Hartford, Conn.—Fire Board has recommended that truck company be located in 1910 in northern part of city, and that new quarters be provided for engine company No. 2; these could both be housed in one building to be erected near Pleasant st. at total cost of $51,155.—H. B. Clark, President.

Stamford, Conn.—Purchase of auto combination chemical and hose wagon is being considered.

Pensacola, Fla.—Board of Safety is considering establishment of another truck house.

Hoopeston, Ill.—Council has empowered Fire and Water Committee to purchase hose cart, scaling ladders, chemicals and 1,000 ft. of hose.

Quincy, Ill.—Fire insurance inspectors have recommended installation of electric fire alarm system.

Quincy, Ill.—Aldermen O'Brien, Abbott, Schelp and Bergman, of Permanent Improvement Committee, are considering erection of fire engine house in Seventh Ward.

Berne, Ind.—Chief F. Amstutz will purchase hose, rubber coats and a new ladder wagon.

Fort Wayne, Ind.—Mayor has recommended $6,500 appropriation for new police fire alarm system.

Indianapolis, Ind.—Board of Public Safety is favorable to erection of two engine houses on North Side.

Cedar Falls, Ia.—Fire Committee will at once purchase 300 ft. of hose and three new chemical cans.

Charles City, Ia.—Council has voted $2,000 for purchase of new fire wagon.

Oskaloosa, Ia.—City will purchase double chemical engine.

Ottumwa, Ia.—City is considering erection of $5,000 fire station.—H. Schmidt, Fire Chief.

Tipton, Ia.—Hose wagon will be purchased.

Waverly, Ia.—Local firemen have asked for chemical engine.

Topeka, Kan.—Architect J. C. Holland has drawn up specifications for 17 fire escapes which are to be placed on school buildings of city, and and bids are being asked for, which will be opened by Board in December.

Covington, Ky.—Fire Marshal Griffith will recommend purchase of a steam fire engine for Latonia, a chemical, truck, hose wagon and additional fire house.

Winfield, La.—Village will purchase three 500-ft. hose carts and hook and ladder truck.

Adams, Mass.—City will purchase 1,000 ft. of hose.

Malden, Mass.—Town has $5,000 available for purchase of auto truck.

Milford, Mass.—Town has voted $2,500 appropriation for fire department.

Somerville, Mass.—Auto combination chemical wagon will be purchased.

Springfield, Mass.—Fire Commission has asked for $40,000 appropriation for purchase of motor-driven apparatus.

Sterling, Mass.—City will purchase hose wagon.

Swampscott, Mass.—Fire Committee has recommended purchase of $2,200 truck.

Mason, Mich.—Combination hose, chemical and ladder truck will be bought and fire alarm system installed.

Portland, Mich.—City will buy hose wagon.

Bovey, Minn.—Fire Chief J. K. Jasper has recommended purchase of 500 ft. of hose, three axes and three lanterns.

Gulfport, Miss.—Citizens will vote on $35,000 bonds to erect fire station, repair city hall, storm sewer additions and bridges.—M. F. Sullivan, City Engineer.

Springfield, Mo.—Council Committee has estimated that $30,000 will erect and equip three proposed new fire stations.

Roundup, Mont.—Bids have been asked for 600 ft. of fire hose.

Omaha, Neb.—Bids will be asked for installation of practically new fire alarm system.

Berlin, N. J.—Berlin Fire Company will purchase site and erect house.

Clayton, N. J.—Plans have been completed for erection of $2,000 fire house.

Manasquan, N. J.—Fire officials are considering purchase of new apparatus.

Salem, N. J.—City will install fire alarm system as soon as sufficient water pressure is obtained.

Albany, N. Y.—Site on Lark st. near Madison ave. will be secured for erection of $35,000 truck house.—W. B. Melius, City Engineer.

New York, N. Y.—Architect Chas. P. Meyers has prepared plans for $66,000 three-story hook and ladder house.

Poughkeepsie, N. Y.—American Chemical Engine Co., Arlington, will erect fire house.—C. H. Quick, Chairman.

Schenectady, N. Y.—Board of Contract and Supply has rejected six bids presented for automobile for Fire Chief Yates; bids were rejected for the reason that the Board has decided to change specifications and will purchase more powerful machine than was first decided upon. New bids will be advertised for.

Alliance, O.—Fire department will secure aerial hook and ladder truck.

Hamilton, O.—Director of Public Safety D. H. De Armond has plans for erection of two engine houses in First Ward; cost $15,000; Fifth and Sixth Ward houses will be equipped with auto wagons, gasoline automobile will be purchased for Chief; also motor aerial truck.

Kenmore, O.—Council has passed ordinance creating fire department.

Clinton, Okla.—City will purchase 1,000 ft. of hose.

El Reno, Okla.—Citizens will vote Dec. 21 on $20,000 bonds for fire station.

Guthrie, Okla.—Chief Gruber will purchase one steamer, one aerial truck and two hose wagons; fire alarm system will be installed.

Guymon, Okla.—City will purchase 1,000 ft. of new hose.

New Castle, Pa.—Council is considering purchase of site for central fire engine house.

Philadelphia, Pa.—Architect W. Bleddyn Powell is preparing plans for two engine houses; cost $45,000.

Wilkes-Barre, Pa.—Chief Frank Bittenbender has asked Council for 1,000 ft. of hose.

Lincoln, R. I.—Prospect Hill Fire District is considering erection of fire house.

Wakonda, S. D.—Volunteer fire department has been organized with Wallace Wright as Chief.

Dallas, Tex.—Fire Chief H. F. Magee and Fire Commissioner H. L. Seay will visit number of cities to inspect auto apparatus.

Marlin, Tex.—City has purchased site on which to erect combined fire station, city hall and prison.

Brigham, Utah.—Council and Fire Department are considering installation of up-to-date fire alarm system.

Warrenton, Va.—Lack of fire fighting facilities and water allowed fire to destroy the west end of town.

Williamsburg, Va.—Council has made appropriation to erect engine house.

Seattle, Wash.—City is considering $12,000 appropriation for changing hose reels on fire boat Duwamish from hold to deck and for other work.

Spokane, Wash.—Fire department desires more modern equipment, including a water tower.

BIDS RECEIVED AND CONTRACTS AWARDED

Lawrence, Mass.—Contractor Lang will be awarded contract for new Fifth Ward engine house, providing he can build it according to revised plans for $5,000 less than his bid of $25,000 submitted recently.

Lynn, Mass.—E. T. Reynolds, agent for Pope-Hartford Co., has offered to furnish city with two motor propelled chemical and hose wagons at $4,300 each, or $8,400 for the two; a 40 h.p. runabout for Fire Chief at $2,750 and motor driven ambulance and patrol wagon for $3,650.

Springfield, Mass.—The Fire Commissioners have awarded to Gamewell Co. the contract for the new fire alarm system for $30,000; two bids were submitted, that of the Gamewell Co. being high.

Beaver Falls, Pa.—Councils have let contract to Gamewell Fire Alarm Company of New York for immediate installation of fire alarm system; fifteen boxes are to be put into service, with others to be added later.

Farmville, Va.—City has awarded contract to R. S. Rice, Farmville, for erection of proposed concrete fire department building.

ELECTRIC RAILWAYS

Hayward, Cal.—Work will be started shortly after the first of the year on the extension of the Oakland Traction Co.'s Hayward line from this city to Niles.

Oakland, Cal.—Oakland Traction Co. has been granted franchise to operate electric railway along Grand ave.

San Diego, Cal.—Council has granted franchise to San Diego, El Cajon & Escondido Electric Railway Co. to construct an electric railway in San Diego and extending to Escondido; distance 65 miles; capital $2,500,000.—G. W. Pursell, General Manager.

Stockton, Cal.—Application has been made to Council by Stockton Terminal & Eastern R. R. Co. for franchise over streets within city limits.—R. N. Griffith, President.

Atlanta, Ga.—The Irwinton Railway Co. has been granted charter; company has $15,000 capital stock and is organized for purpose of building railroad 3¾ miles long from McIntyre to Irwinton, county seat of Wilkinson County; among the incorporators are J. L. Byington, State Commissioner of Pensions J. W. Lindsey, Representative G. H. Carswell, I. B. Stinson, I. E. Burkett.

Chicago Heights, Ill.—Chicago Heights & Eastern Electric Railroad Company has applied to County Board for 75-year franchise to construct electric railway from Chicago Heights east to State line.

Lafayette, Ind.—Tippecanoe County Commissioners have granted Indiana & Northern Traction Co. a 55-year franchise for construction of electric railway from battleground north to the county; George A. H. Shielder, A. H. Shielder, B. F. Burk, E. H. Neal, Marion, and George Breed, Philadelphia, Pa., are interested.

Lapel, Ind.—Town Board has granted franchise to Wallace B. Campbell, Anderson, for construction of electric railway.

Adel, Ia.—Citizens have voted to grant franchise to Adel City Railway Co. to construct and operate street railway.

Lake City, Ia.—Council is considering ordinance granting franchise to the Des Moines & Sioux City R. R. Co.

Burlington, Ky.—The Boone County Fiscal Court has granted franchise to Cincinnati, Louisville, Lexington & Maysville Traction Co., of Dry Ridge.

Duluth, Minn.—Construction of a street car line on 40th ave. W. and on 8th st. to 63d ave and the bay is being considered.

Winona, Minn.—La Crosse and Winona Traction Co. has asked for a 50-year franchise for electric line to La Crosse, via Galesville.

Kearney, Neb.—Carson Hildreth, Franklin, is interested in proposed construction of Kearney & Beloit railway line.

Fayetteville, N. C.—Raleigh & Southport Railway Co. is planning to build extension of its line from this city to Hope Mills; distance seven miles.—John A. Mills, Raleigh, President.

Mercer, Pa.—Iron City Engineering Co., of Pittsburg, has applied to Council for franchise to construct and operate street railway system and electric light plant.

Phœnixville, Pa.—Phœnixville, Valley Forge and Strafford Electric Co. has been organized to construct line; power house will be erected; total cost $60,000.—A. W. Kley, T. E. O'Connell and C. F. Bader are interested.

Pittsburg, Pa.—West Penn Railways Co. will extend its system from Greensburg to New Alexandria; distance seven miles; from Uniontown to Leisenring, seven miles; from Hunker to West Newton, ten miles, and from West Newton to Scott Haven, five miles.

Florence, S. C.—Franchise for electric street railway has been granted to John L. Barringer, P. A. Wilcox, William J. Brown and S. F. Ingram.

Florence, S. C.—Council has granted franchise to John L. Barringer, P. A. Willcox, William J. Brown and S. S. Ingman for construction of electric railway on all streets.

Aberdeen, S. D.—Aberdeen Street Railway Co. has been granted 20-year franchise to construct and operate a street railway.

Nashville, Tenn.—Charter has been granted to Crandall & Shady Valley Railroad Co., of Johnson County, capital stock $10,000; incorporators, R. E. Donnelly, H. A. Donnelly, R. E. Butler, D. H. Donnelly, W. T. Smythe; company proposes to construct railway from Crandall, Johnson County, up Beaver Dam Creek to top of Cross Mountain, in Johnson County.

Byers, Tex.—Commercial clubs of Byers and Henrietta in Clay County are holding conferences with view to building railroad from Henrietta to Byers and thence north to Chickasha, Okla.

Salt Lake City, Utah.—Castle Valley Railway has been incorporated to build electric railway from Price to Cedar Creek Canyon.—W. C. Rice, Salt Lake City, President.

Salt Lake City, Utah.—Salt Lake & Los Angeles Railway Co. has applied to County Commissioners for a 50-year franchise to operate railway from this city to Saltair.

Colonial Beach, Va.—Municipal Council has granted franchise to Hon. John G. Capers, Evans Bldg., Washington, D. C., for construction of electric railway from Colonial Beach to Quantico; distance 22 miles.

Newport News, Va.—Newport News & Old Point Comfort Railway & Electric Co. will build extension to Buckroe Beach.

Pasco, Wash.—County Commissioners have granted franchise to N. G. Blalock, representing the Walla Walla & Columbia Traction Co., to enter Franklin County with an electric railroad.

Tacoma, Wash.—Articles of incorporation of Cle Elum Traction Co., a $300,000 transportation company operating between Cle Elum and Roslyn, Kittitas County, have been filed. Frank S. and M. E. Farquhar, city, are trustees and incorporators; articles state that apart from connecting line it is proposed to establish branch lines at different points.

Walla Walla, Wash.—Directors and executive officers of the Washington-Oregon Traction Co. have decided to commence building their line from Pendleton.

Appleton, Wis.—Outagamie residents are considering the building of electric line from Appleton through to Hortonville, Waupaca to Hancock connecting there with the Chicago and Wisconsin Valley lines; A. B. Barnes, Vice-President of C. & W. line, is interested.

Calgary, Alta., Can.—Ratepayers have passed the by-law authorizing extensions and improvements to local street railways at cost of $40,000.

BIDS RECEIVED AND CONTRACTS AWARDED

Meriden, Conn.—Meriden, Middletown & Guilford Railway Co. has awarded contract to F. Arrigoni & Bros. for building of section of its proposed electric railway from Durham to Middletown.—Francis Atwater, President.

Fairmont, W. Va.—Talbott Bros., contractors, have been awarded contract by Fairmont & Northern Railroad Company to build line between Grant Town and this city.

BRIDGES

Fort Smith, Ark.—Central Division St. Louis & San Francisco Railway will expend $100,000 this year for the construction of bridges and culverts on his division.—LeRoy Kramer, Superintendent.

Pueblo, Col.—City proposes to replace present high truss bridge over Arkansas River on Union ave. with modern, well-lighted, street wide bridge; span is 155 ft. long and width of street 80 ft.; bridge is to be paved.—D. P. Gaymon, City Engineer.

Jacksonville, Fla.—County Commissioners have ordered plans prepared for erection of steel bridge across McGirts Creek at Dinsmore.

Orofino, Ida.—County Commissioners will construct steel bridge over Orofino Creek.

Peoria, Ill.—Mayor Woodruff and Corporation Counsel Radley are considering legal rights of city in matter of devising ways and means to construct a new bridge; cost $250,000.

Gas City, Ind.—The Indiana Union Traction Co. has decided to construct new bridge over Mississinewa River at this place.

Huntington, Ind.—County Commissioners have rejected all bids received Nov. 9 for constructing steel or concrete bridge over Little River at Union and Huntington Township lines; bids will be readvertised; cost $5,000.—J. N. Weaver, Auditor.

Indianapolis, Ind.—Marion County Commissioners are considering building of bridge across White River at W. New York st.

Jeffersonville, Ind.—Council is considering building of bridge for wagons and street cars across Ohio River.

Shreveport, La.—Site is being selected on which to erect proposed $300,000 bridge over Red River.—Capt. Clarke S. Smith, U. S. Engineer, Vicksburg, Miss., is interested.

Three Rivers, Mich.—Citizens have voted

to issue bonds for construction of bridge at Wood st. over St. Joe River, and one at Mill st. over Emery Tail Race; work will be done by day labor in spring, with the Superintendent of Water Works in charge.—G. A. Eagleton, City Surveyor.

Minneapolis, Minn.—Theodore Wirth, Park Superintendent, has decided that construction work will not be started until spring on bridges to span canal between Cedar Lake and Lake of the Isles.

Gulfport, Miss.—Citizens will vote on bonds for bridge construction.—M. F. Sullivan, City Engineer.

Farmington, N. M.—Board of County Commissioners have been directed to construct bridge across San Juan River near the town of Fruitland.

Niagara Falls, N. Y.—Finance Committee has decided to appropriate $5,000 for repairs to Terry ave. bridge.

Bellefontaine, O.—Bids are being received by Board of Commissioners of Logan County for repairing bridge in Richland Township.—C. M. Ritchie, County Engineer.

Dawson, O.—Shelby County Board of Commissioners is preparing plans and will soon advertise for bids for a bridge over canal.—W. A. Looker, County Engineer.

Dayton, O.—Council is considering ordinance ordering issuance of $170,000 bonds for construction of Stewart st. bridge.

Degraff, O.—Logan County Board of Commissioners has rejected all bids for 65-ft. steel span bridge, with concrete floor and abutments; new bids will soon be called for.—C. M. Ritchie, County Engineer.

Huron, O.—Plans are being prepared by County Engineer A. C. Schultz, Sandusky, for lift bridge, for Board of Commissioners of Erie County; will require bids three ways, as follows: Steel superstructure, 80-ft. center span (to lift), one approach 96-ft. span, other 28-ft. span; steel girder superstructure, 80-ft. center span (to lift), two approaches, 66-ft. spans; reinforced concrete, 80-ft. center steel span (to lift), one approach, 80-ft. arch, other 58-ft. arch.—John Dietz, Commissioner.

Sidney, O.—Shelby County Board of Commissioners is preparing plans for 63-ft. steel span bridge, with metal reinforced and brick floor and stone abutments, in Sidney Township.—W. A. Looker, Engineer.

Tiffin, O.—Plans are being prepared by County Engineer H. Puffenburger for 44-ft. span steel bridge, with reinforced concrete abutments, in Jackson Township.—John Lenartz, Auditor Seneca County.

Guthrie, Okla.—City will construct viaduct at Cleveland ave.; cost $250,000.—Address the Mayor.

Guthrie, Okla.—Guthrie Street Railway Co. will construct viaduct over the Santa Fé tracks to connect the east and west side lines.

Medford, Ore.—Erection of bridge over Bear Creek is being considered.

Portland, Ore.—Working plans for proposed new O. R. & N. bridge across Willamette River to replace the old steel bridge are nearing completion and within next 30 days bids will be asked for the substructure.—Waddell & Harrington, Engineers.

South Bethlehem, Pa.—Council and Reading Railway officials are considering erection of bridge at North st. and establishment of crossing.

Providence, R. I.—Council is considering erection of bridge and construction of road across Blackstone River in order to secure proposed erection by C. L. Harding of worsted yarn mill.

Memphis, Tenn.—Board of Public Works has passed ordinance providing for construction of proposed bridge by Southern Railway over tracks at Madison ave.—W. H. Wells, Chief Engineer of Construction, Washington, D. C.

Baileyville, Tex.—Milam and Robertson Counties are considering construction of bridge across Brazos River.

Houston, Tex.—Bids will be received by Commissioners' Court of Bee County for construction of steel bridge over Aransas Creek on Skidmore and Saunders store rd.—Dan Troy, County Clerk.

Terrell, Tex.—Nine steel bridges are to be constructed in Terrell-Elmo Commissioners' District as soon as possible.—Henry Hart, Commissioner.

Kaloma, Wash.—Cowlitz and Clarke Counties are considering erection of bridge at Woodlands.

Puyallup, Wash.—Board of Trade is urging erection of another bridge across Puyallup River.

Spokane, Wash.—City has awarded $500,000 bridge bonds to Harris Trust & Savings Bank, E. H. Rollins & Co. and others.

Janesville, Wis.—County Board is considering legality of county's paying half the cost of constructing bridge over Turtle Creek.

Milwaukee, Wis.—Council is considering improvement to 16th st. viaduct.

Superior, Wis.—Work of extending Belknap st. viaduct eastward over Northern Pacific, South Shore and Terminal tracks will be started shortly; Mayor Crumpton has been notified by officials of the Great Northern that arrangements had been made for extension of viaduct.

BIDS RECEIVED AND CONTRACTS AWARDED

San José, Cal.—The contract for the Campbell Creek bridge on the San Francisco road was awarded to John W. Williams for $1,396.

New Haven, Conn.—Award of contract for the new Edgewood ave. bridge across West River has been made by Director Foley to Robert D. Daley, the lowest bidder, at $43,314.70; the lowest bid for the grading work was Frank Brazos, whose bid was $15,195. The complete bids follow:

Grading work—A. N. Farnham, $23,225; Robert D. Daley, $19,040; C. W. Blakesless & Sons, $16,870; Thomas F. Maher, $15,900; Frank Brazos, $15,195.

Construction work—Aberthaw Construction Co., $61,419.30; David H. Clark Co., $56,471; C. A. Sibley, $56,115.35; Thomas F. Maher, $51,748.50; Ryan-Unmack Company, $46,369.90; C. W. Blakesless & Sons, $47,907.03; Schweier & Sutton, $44,744; Robert D. Daley, $43,314.70.

The grading work will require about 34,800 cu. yds. of material

North Vernon, Ind.—Miller Bros. have secured contract to construct $65,000 worth of cement bridges for the Louisville & Nashville R. R. Co.

Easton, Md.—Fisher & Corozza, 614 American Bldg., Baltimore, Md., have contract at $31,238 to construct bridge and draw over Choptank River at Dover Bridge, which connects Talbot and Caroline Counties.

Atoka, Okla.—Pittsburg County Commissioners have let contracts for six more bridges; new contracts include a large bridge at Breeden, over Gaines Creek; the price of this complete was $5,019. Five other bridges cost $5,865, and construction where the county had already bought the steel, $3,385, total of $14,269; contract was awarded the Kansas City Bridge Co.

Homer City, Pa.—County Commissioners have let contract for bridge across Yellow Creek to York Bridge Co., York, Pa., at $4,450.

Knoxville, Tenn.—Foster - Creighton - Gould Co., of Nashville, general contractor for construction of Asylum ave. viaduct, has awarded following contracts for materials: West End Macadam Co., of Knoxville, for stone; Chandler & Co., Knoxville, for cement; General Fireproofing Co., Youngstown, O., for reinforcing or steel part of structure; contract for sand has not been awarded, but probably will be secured by Knoxville Company; estimated that 3,000 yards of concrete and 200 tons of steel will be required.—C. B. Wilson, Engineer of Foster-Creighton-Gould Co., will supervise work.

Sherbrooke, Que., Can.—Bids were opened Oct. 30 for construction of steel bridge across Magog River at Sherbrooke, and contract has been awarded to the Mackennon-Holmes Steel Co., of Sherbrooke, for $21,700.—F. J. Griffith, City, Secretary-Treasurer.

MISCELLANEOUS

Alameda, Cal.—Council has decided to issue $7,500 for installation of Gamewell red light police signal system.

Livermore, Cal.—For purpose of purchaschasing block bounded by J and K, 3d and 4th sts., for use as site for new Carnegie Public Library and also for a public park, Board of Trustees has decided to submit to issuance of $10,000 bonds.

Oakland, Cal.—Plans have been prepared for proposed city hall; $1,150,000 bonds voted.—F. K. Mott, Mayor.

Oakland, Cal.—Citizens have voted $1,150,000 bonds for city hall and $80,000 for building for police and fire departments; also $2,503,000 bonds for improvement of water front.

San Diego, Cal.—Board of Park Commissioners is considering selection of design for electric fountain to be erected on the park plaza as result of gift of Louis J. Wilde, President of the American National Bank; cost $10,000.

San José, Cal.—Councilman Brobaska has submitted plans for drinking fountains and public comfort stations.

Denver, Col.—Establishment of public playgrounds by 100 towns in mountains of Colorado is the undertaking which Congressman Edward T. Taylor, of Colorado Springs, has begun by writing to the Mayors of all the towns; Mr. Taylor will introduce bills at next session of Congress setting aside land for parks adjacent to various towns.

Jacksonville, Fla.—County Commissioners have ordered bids advertised for erection of addition to county hospital.

Lakeland, Fla.—Citizens have voted $65,000 improvement bonds.

Panama, Fla.—Council has granted franchise to St. Andrews Bay Telephone Co. to construct, operate and maintain a telephone business.

Panama City, Fla.—Citizens have voted $2,500 bonds for municipal purposes.

St. Petersburg, Fla.—Council has ordered purchase of dredge; cost $5,000.

Atlanta, Ga.—City has postponed date of election from Dec. 15 to Feb. 15, 1910, on $100,000 bonds for hospital; also on $50,000 bonds for construction of crematories.—Robert F. Maddox, Mayor; R. M. Clayton, City Engineer.

Anderson, Ind.—For Boards of School Trustees and Public Works of this city a Consulting Engineer of Detroit has estimated that municipal steam heating plant for purpose of heating several of the city's large school buildings can be installed for $40,000; both Boards are favorable to project.

Fort Wayne, Ind.—As part of plan for cleaning out almost closed interceptor sewer, Mayor Hosey will ask the Council to appropriate $1,500 to build cofferdam in St. Mary's River.

Carlisle, Ky.—Carlisle Electric Light & Power Co. is preparing to put in ice manfacturing plant to be run in connection with light and power plant.

Wellesley, Mass.—Town has received a lot of land off Hillside rd. to be used for park purposes.

Hastings, Neb.—Mayor Miles has recommended erection of isolation hospital.

Hackensack, N. J.—Mayor Courtlandt Linkroum is favorable to erection of $125,000 town hall.

Montclair, N. J.—Essex County Park Commission announces that it is ready to expend $100,000 for beautifying town parks and $15,000 for additional lands.

Summit, N. J.—Mayor Boyd Risk and others are interested in establishment of park along Passaic River; project includes rebuilding of Stanley dam between this city and Chatham.

Trenton, N. J.—Board of Freeholders is considering purchase of additional property for erection of destitution house.—Philip Freudenmacher, Sheriff.

Albany, N. Y.—Mayor Snyder has signed ordinance for purchase of land in 13th Ward for park purposes.

New York, N. Y.—Board of Aldermen has appropriated $15,000 for preliminary expenses in preparation of plans for new Essex Market prison.

Rochester, N. Y.—Commissioner of Public Works Elwood is considering purchase of new street signs to be placed on standards in number of principal streets.

Cleveland, O.—Two ordinances granting franchises for $50,000,000 subway system to Cleveland Subway Co.

Columbus, O.—City officials have under consideration plan to build great part of levee on east bank of the Scioto River, from Mount st. to Green Lawn ave., in early part of next year.

Dravosburg, Pa.—Citizens will vote in February on bonds for erection of municipal building.

Knoxville, Tenn.—Council has ordered election on $50,000 bonds for purchase of park site.

Dallas, Tex.—Board of Municipal Commissioners has adopted specifications for street naming and house numbering as prepared by Assistant Postmaster Jas. E. Forrest; bids will be advertised for providing figures and numbering of houses.

Lynchburg, Va.—City is considering construction of crematory for destruction of its garbage; correspondence with companies making a specialty of constructing plants of this character is desired.—H. L. Shaner, City Engineer.

Seattle, Wash.—City Engineer Reginald H. Thomson has conceived a sea-wall plan that will extend water front half mile into Elliott Bay, allow opening of three streets between Railroad ave. and the Sound, and cost as much or more than all of the large regrade projects heretofore undertaken combined.—John F. Miller, Mayor.

Seattle, Wash.—Park Board will purchase site at 59th and Pilgrim sts. for playfield purposes.

Tacoma, Wash.—Architects Potter and Merrill, Provident Bldg., have asked bids for erection of $20,000 sanitary public market at corner of South 11th and D sts.

Milwaukee, Wis.—Alderman A. F. Braun will ask Council to call election on $35,000 bonds for erection of police station in 23d Ward.

North Vancouver, B. C., Can.—Ratepayers have approved by-law to borrow $128,000 for purchase of a new ferry steamer and construction of new wharves.

BIDS RECEIVED AND CONTRACTS AWARDED

Jacksonville, Fla.—The County Commissioners have awarded contract for engraving of county bonds to the United States Mortgage and Trust Co., of New York; the contract calls for the engraving of 1,000 bonds of the denomination of $1,000 each, and the contractors are instructed to certify to the same.

Boston, Mass.—Bids were received as follows by Charles River Basin Commission, Nov. 22, for furnishing and erecting a c.-i. fence and two flights of iron stairs on the Charles River Dam in Cambridge and Boston: Vulcan Rail & Construction Co., 175-177 North 9th st., Brooklyn, N. Y., $8,264, awarded contract; Gibby Foundry Co., Condor st., East Boston, $11,295; Walworth Construction & Supply Co., 100 Pearl st., city, $12,780; John Pirkl Iron Works, 240-246 North 10th st., Brooklyn, N. Y., $13,675; Hecla Iron Works, 118 North 11th st., Brooklyn, $15,500; A. B. Robbins Iron Co., Quincy, $19,500; W. A. Snow Iron Works, Inc., 19 Portland st., city, $23,700.

New York, N. Y.—Bids were received as follows by Department of Water Supply, Gas and Electricity, Nov. 17, for furnishing and delivering cement: Stephen V. Duffy, 34 Stratford rd., Brooklyn, $1.73 per bbl.; Edward E. Huhla Co., $1.74.

Pauls Valley, Okla.—Council has let a contract to R. E. Carter for the erection of a City Hall building to cost $12,500; in the second story an auditorium will be arranged with a seating capacity of 800.

Philadelphia, Pa.—Edwin H. Vare has been awarded annual street cleaning contract for 1910 at an increase of $100,000 over amount for the present year. This year's bid was $1,299,000; as part of contract Vare will have to pay Rapid Transit Company $212,000 instead of $187,000 as last year, and will also have to make passages through snow and mud to rear end of trolley cars at street crossings, besides the separate collection of paper and household refuse.

Contractor McNichol's Penn Reduction Company turned in the lowest bid for the collection of garbage, the amount being $497,000, an increase of $9,000 over last year.

James Irwin, Peoples Brothers and H. A. McCleman & Bros., of South Philadelphia, bid on the removal of snow. From 68c. to 85c a single load, and 70c. and $1.92 for double load was the lowest bid for hauling to a manhole and for hauling to dump. Last year city spent about $5,000 in removing snow from streets in business section.

Fort Worth, Tex.—Each of 2,500 street intersections within corporate limits of the city of Fort Worth is to be immediately equipped with a handsome, substantial metallic street sign, which, swinging from an ornamental iron pole embedded in concrete, has been ordered by City Commission. City Engineer Trammell recommended that C. Rosenfield & Co., Fort Worth concern, be given contract, they having bid $2.96 for poles and signs installed in downtown business districts and $2.66 in residence section.

Norfolk, Va.—The contract for the construction of a sea wall at the Navy Yard was awarded by the Navy Department to Alsop & Pierce, of Newport News, at $65,000.

TOO LATE FOR CLASSIFICATION

STREET IMPROVEMENTS

East St. Louis, Ill.—Bids will be received by Board of Public Works, Dec. 10, for improvement of Illinois ave., by constructing vitrified brick paving, on concrete foundation, with sandstone gutter curbs and concrete parkway curbs; cost, $90,000.—W. J. Crocken, City Engineer.

Decatur, Ind.—Bids will be received by Council, Dec. 7, 7 p. m., for construction of sidewalk on Mercer ave.—O. B. Wemhoff, City Clerk.

Pratt, Kan.—Petition is being circulated to secure money to drag and smooth up public streets.

Tonganoxie, Kan.—Bids will be received Dec. 13 for construction of brick sidewalks.—E. F. Cooledge, City Clerk.

New Orleans, La.—Council has passed finally on plans and specifications drawn by City Engineer providing for paving City Park ave., from Bayou St. John to Canal st., with mineral rubber sarco.

Mt. Washington, Mo.—Surveyor R. T. Proctor, of Jackson county, Kansas City, is taking bids for macadam paving between 15th and 18th sts., on Arlington ave.,—S. A. Boyer, City Clerk.

Kearny, N. J.—Residents of Davis ave. have petitioned for paving that street with Hassam pavement.

Bowling Green, O.—Bids will be received Dec. 20 for improving Byall ave.—Alex. Williamson, Clerk.

Cincinnati, O.—Bids will be received by Board of Director of Public Service, Dec. 6, noon, for furnishing necessary labor and materials for improvement of Houmann alley, by grading, setting granite curb, paving roadway with brick.—Jno. J. Wenner, Clerk.

Dayton, O.—City Engineer Cellarius has presented elaborate plan for establishment of boulevard system in connection with $450,000 improvement along Miami River south of the city; proposal is to extend the levee improvement from South Park to Lehman st.; distance seven miles.

East Liverpool, O.—Council is considering improvement ordinances calling for laying of about 35,971 sq. yds. of brick.

Logan, O.—Hunter st. will be paved next spring.

Portsmouth, O.—Bids will be received by Board of Directors of Public Service, Dec. 4, noon, for filling and grading Union st.—Geo. H. Schneider, President.

Toledo, O.—Board of Public Service will recommend paving of Broadway from Knapp to Perry st.

Utica, O.—City has awarded $31,931 paving bonds to new First National Bank, Columbus, for premium of $1,485.

Norristown, Pa.—Special Committee of Town Council having under consideration question of inaugurating permanent paving, has decided favorably upon proposition by agreeing to recommend to Council paving of West Elm st.; distance of 900 ft.; Committee also decided to immediately advertise for bids for work on various forms of street surfacing, although the brick paving is the preference of Committee, and to submit bids to Council with report.

Murray, Wash.—Work of paving sidewalks on Wasatch ave. will begin very shortly.

SEWERAGE

Chicago, Ill.—City has again rejected all bids for $2,500,000 sewer bonds; issue will be offered again in January.

East St. Louis, Ill.—Bids will be received by Board of Public Works, Dec. 10, for constructing vitrified pipe sewer system on Illinois ave.; cost, $50,000.—W. J. Crocken, City Engineer.

Belle Plaine, Ia.—Council has taken up matter of construction of sewer system next season, and decided to proceed with building of between four and five miles of sewers.

Clinton, Ia.—Bids will be received, Dec. 14, 8 p. m., for constructing sewer.—W. E. Hayes, City Clerk.

Wichita, Kan.—Bids will be received Dec. 6, 9 a m, for construction of main line of sanitary sewer No 12, known as the College Hill Sanitary Sewer.—Wm. Sence, City Clerk.

Omaha, Neb.—Bids will be received Dec. 6, 2 p. m., for construction of sewers in Districts Nos. 388 and 398.—D. B. Butler, City Clerk.

Westfield, N. Y.—Plans are being prepared by Consulting Engineer Fred. K. Wing, White Bldg., Buffalo, N. Y., for about twenty miles of vitrified tile pipe sewers and sewage purification plant, including two septic tanks and four filter beds; bids will be received by Board of Village Trustees in spring.

Cincinnati, O.—Finance Committee has ordered $17,500 bond issue for building sewers in Harrison ave. and four other streets.

Cincinnati, O.—Council has ordered plans for sewer system through village of California.

Cincinnati, O.—Plans have been prepared for construction of sewer in Baltimore ave.

Collinwood, O.—Bids will be received Dec. 13, noon, for construction of four sanitary sewers, one storm water sewer, construction of delinquent water curb connections, and sanitary sewer connections on two streets and improvement of Vine st.—J. F. Murray, Village Clerk.

Corlett, O.—Otis & Hough, Cleveland, have been awarded $4,000 Windfall ave. sewer bonds of town, their premium being $165.

Lakewood, O.—Bids will be received Dec. 6, 11 a. m., for constructing sections Nos. 1 and 10 of the Detroit st. sewer main.—Wm. H. Evers Engineering Co., 332-334 The Arcade, Cleveland, Engineers; B. M. Cook, Village Clerk.

Dunmore, Pa.—Bids will be received Dec. 7, 8 p. m., for construction of sewers Sec. K, of Second Sewer District.—L. S. Marsh, 116 E. Pine st., Borough Secretary.

Duquesne, Pa.—Bids will be received Dec. 6, noon, for construction of sewers in Hamilton ave.—L. D. Miller, Chairman Sewers Committee.

WATER SUPPLY

Alameda, Cal.—People's Water Co. will lay 12-in. water main in Park st. through business section.—Frank Leach, President.

Newark, Del.—But one bid was received and rejected, Nov. 22, by Light and Water Commission for 1,800 ft. of 4-in. c. i. pipe; bids will be readvertised early in spring.—L. B. Jacobs, Chairman.

Sabetha, Kan.—Citizens have voted $65,000 water works bonds.

Concord, N. H.—Water Board is considering extension of water system to the Plains district; cost, about $20,000.—Percy A. Sanders, Superintendent; H. E. Chamberlain, City Clerk.

Livonia, N. Y.—Board of Trustees has sold $6,000 water bonds to I. W. Sherrill, Poughkeepsie; source of water supply will be changed from Conesus Lake to Nickerson Springs.

New York, N. Y.—Bids will be received Dec. 16 by Water Board for work on Catskill aqeduct system at estimated cost of $4,000,000; work is construction of Grassy Sprain cut and cover, Platt ave., siphon and parts of Ardsley cut and cover.—John A. Bensel, President.

New York, N. Y.—City will issue Dec. 10 $6,000,000 corporate stock for water supply purposes.

Grand Forks, N. D.—Citizens have voted $151,000 improvement bonds; $35,000 is for purer water supply.

East Youngstown, O.—Village Council has given Mahoning Valley Water Co. a franchise to supply East Youngstown with water for period of 36 years.

Broken Arrow, Okla.—Citizens will vote on $35,000 of bonds for the construction of system of water works.—Archer, Rollins & Co., 534-536 Beals Bldg., Kansas City, Mo., Engineers; P. A. Fox, City Clerk.

Ft. Sill, Okla.—Bids will be received by Capt. David L. Stone, U. S. A., Constructing Q. M., Dec. 23, 10 a m., for sinking deep well.

Gotebo, Okla.—Bids will be received about Dec. 8 for construction of system of water works; cost, $28,000.—Archer, Rollins & Co., Engineers, Beals Bldg., Kansas City, Mo.; J. D. Babb, City Clerk.

Oklahoma City, Okla.—City has not fixed date of opening bids for construction work on proposed water works; machinery purchased; $150,000 will be expended.—W. C. Burke, City Engineer.

Lewisburg, Pa.—Council has voted unanimously for municipal water plant, and Committee, consisting of Dr. George C. Mohn, George F. Miller and Aaron C. Stahl, was appointed to carry into effect the resolution of Council.

Tarentum, Pa.—Judge Shafer in an opinion reaffirmed previous opinion that Borough has right to construct water works and supply residents of the Borough with water; Tarentun Water Co. sought to restrain the Borough from constructing water works, alleging it would injure their business.

Terrell, Tex.—Citizens have voted $10,000 city water and light plant improvement bonds.

Salt Lake City, Utah.—Two water mains, one on each side of the street, will have to be laid before paving of Third South st. with asphalt from State st. to Tenth East can be done; estimates are now being drawn up for work in the City Engineer's office; work will cost $50,000.

Wheeling, W. Va.—Board of Control are discussing plans for new building to be erected at city water works with city's Consulting Engineer, J. Richard Kommer, Milwaukee.

Stoughton, Wis.—Bids will be received Dec. 15, noon, for construction of artesian well.—I. C. Currier, City Clerk.

LIGHTING AND POWER

Hayward, Cal.—D. U. Tofflemire, Elmhurst, Greater Oakland, representing United Power Company, organized by Oakland capital, has applied to Town Trustees for franchise to erect poles and run wires through this city.

Panela, Col.—German Mesa Electric Illuminating Co. has been incorporated; capital $2,500.

Delphi, Ind.—Council has granted franchise to Fort Wayne & Wabash Valley Traction Company to do lighting and power business in town.

Elkhart, Ind.—Superintendent Frank R. Flynn, Elkhart Gas Co., has requested

Board of Public Works for permission to install gas light park post system of lighting on Main st. from Franklin st. to High st. for experimental purposes.

South Bend, Ind.—Council has ordered that all wires carrying electrical current must go under ground within four years.

Davenport, Ia.—Messrs. Macay, Tobey, White and Coppell, Directors of Merger Company, are investigating possibilities of enlarging big power plant in Moline or, if not, to provide some way where the power of various companies it controls may be increased.

Columbia Falls, Mont.—City is considering installation of electric light plant; franchise has been refused to North Idaho and Montana Power Co.

Atlantic City, N. J.—Savery Bradley, Philadelphia, is head of syndicate which will enlarge present Pleasantville gas plant and will run conduits as far as Hamfonton and from Absecon to Somers Point.

Buffalo, N. Y.—Col. Ward has requested Aldermen to issue $10,000 bonds to provide additional amount required for burial of fire and police wires.

Jamestown, N. Y.—Taxpayers have defeated proposition to purchase plant of the Jamestown Light & Power Company for $90,000 and consolidate it with municipal plant, thus securing for city a monopoly of the electric lighting.

Monroe, N. Y.—Orange & Rockland Electric Co. will purchase direct-connected, 60-cycle, 3-phase, 2,200 or 2,300-volt unit of not less than 500 k.w. nor more than 1,000 k.w.—R. W. Smith, President.

Cherokee, Okla.—City is considering election on $30,000 electric light bonds.

Muskogee, Okla.—H. M. Byllesby & Co., 218 La Salle st., Chicago, Ill., is considering construction of water-power-electric plant on Grand River.

Scranton, Pa.—Scranton Electric Co. has announced that it will spend about $500,000 on improvements of its service and equipment during coming year.—L. H. Conklin, Manager of the Scranton Electric Light Co

Stanton, Tex.—G. N. Albright is interested in installation of electric light plant.

Terrell, Tex.—Citizens have voted $10,000 city light and water plant improvement bonds.

Salt Lake City, Utah.—Improvements Committee of Council is now at work going over city for purpose of locating more of 100 arc lights for which petitions have been made; new lights will cost city something like $5,000 annually, and will be established on nearly every corner of city.

Marinette, Wis.—Harry J. Brown is interested in development of water power on Menominee River above Marinette; dam will be built to secure 6,000 h.p.

Sheboygan, Wis.—Sheboygan Gas Light Co. has decided to begin work on construction of a new gas holder of about 120,000 cu. ft. capacity; cost about $20,000.—H. Lecker, President.

FIRE EQUIPMENT

Jacksonville, Fla.—Bids will be received Dec. 6, for furnishing and delivering, f. o. b. cars Jacksonville, 1,000 ft. of 3-in. rubber-lined fire hose.—T. W. Haney, Chief Fire Department.

Vincennes, Ind.—Fire Department has $9,000 available for use in equipping two hose houses.

Virginia, Minn.—Bids will be received Dec. 6, 8 p. m., for furnishing the fire department with two fire alarm boxes of the non-interference character and similar to those now maintained.—A. E. Bickford, Secretary Police and Fire Commission.

St. Louis, Mo.—City will soon commence rebuilding engine house No. 36 and also erection of engine houses Nos. 50 and 51; cost about $18,000.

Newbern, N. C.—Bids will be received Dec. 3 for furnishing 2,500 ft. of fire hose for the fire department.—F. T. Patterson, City Clerk.

Salt Lake City, Utah.—Chief W. H. Glore has recommended purchase of more equipment for station No. 6.

ELECTRIC RAILWAYS

Albany, N. Y.—Hornell-Bath Interurban Railway Company has applied to Public Service Commission for authority to construct elaborate line between Hornell and Bath, Steuben County, a distance of 23 miles, passing through the towns of Hornellsville, Fremont, Howard, Avoca and Bath.

Lawton, Okla.—City has granted street railway franchise to Lawton and Fort Sill Electric Railway Company, proposing to construct street railway line in Lawton and interurban to Fort Sill and Medicine Park; distance 20 miles.

BRIDGES

West End, Ala.—Citizens have voted $6,000 for construction of number of concrete bridges.

St. Paul, Minn.—Commissioner of Public Works has submitted to Council plans for approaches to bridge recommended to do away with grade crossings at a point where Earl st. crosses the Chicago, St. Paul, Minneapolis & Omaha and Northern Pacific tracks, adjoining 7th st.; approaches alone will cost $34,000.

Kansas City, Mo.—City Engineer J. L. Darnell is preparing plans for viaduct to be erected at W. 12th st.

Meridian, Miss.—Plans will be prepared for construction of several small concrete bridges and culverts, and bids for the work advertised.—W. G. Wetmore, City Engineer.

Nashua, N. H.—Councils have passed substitute resolution for building proposed Hudson bridge; resolution calls for appointment of committee to confer with Selectmen of Hudson and other towns regarding division of cost and to secure estimate of cost of building bridge between this city and Hudson.—Alderman J. H. Connor is interested.

Caledonia, N. Y.—Towns of Avon and Caledonia have voted $6,000 for bridge over Genesee River.—W. C. Place, Town Clerk.

Cincinnati, O.—Bids will be received Dec. 17, noon, for construction of concrete bridge over Mill Creek at Benson st.—Stanley Struble, President Hamilton County Board of Commissioners.

Mt. Gilead, O.—Bids will be received by Board of Commissioners of Morrow County Dec. 2, for construction of a bridge in Harmony Township.

Youngstown, O.—Modern steel bridge will take place of the footbridge over Mahoning River, between Poland ave. street car line and Youngstown Sheet and Tube Co.'s plant; work on bridge will be started at once.

MISCELLANEOUS

Long Beach, Cal.—Board of Public Works has rejected bids recently received for construction of municipal docks, being considered too high; lowest bid was that of Burcham Bros. for $34,998.

San Francisco, Cal.—Board of Works has petitioned City Supervisors for $300,000 appropriation to begin work on incinerating plants of garbage disposal system; plans have been prepared.

Moline, Ill.—East Moline Commercial Club is now considering proposition to secure park for city.

Baltimore, Md. — President Sherlock Swann, Police Department, will ask Legislature to authorize $1,000,000 police loan bill for central building for police headquarters, commissioners and detective departments.

Omaha, Neb.—Council has appropriated $1,500 with which to repair barn destroyed by fire when patrol station was destroyed.

Omaha, Neb.—Committee on Public Property will consider request of Fire and Police Board for appropriation to buy new equipment; new auto patrol, one-horse patrol wagon, emergency wagon, harness, etc., is desired.—W. J. Hunter, Commissioners.

Hoboken, N. J.—Corporation Attorney John J. Fallon is preparing papers to bring condemnation proceedings to secure site for new police headquarters at corner of First and Hudson sts.

Trenton, N. J.—City received no bids for $200,000 city hall bonds.

New York, N. Y.—City will issue Dec. 10 $6,000,000 corporate stock for various municipal purposes and $500,000 for building in Bryant Park.

Cleveland, O.—Councilman Pelcinski will ask Council for $10,000 appropriation to establish park in Seventeenth Ward.

Dayton, O.—Board of Health will urge establishment of public abattoirs.—Dr. J. M. Howell, President.

Walbridge, O.—Bids will be received Dec. 14, noon, by Trustees of Lake Township, Wood County, for erection of town hall.—N. A. McAllister, Clerk.

Ellwood City, Pa.—City Engineer Alexander Main will start work on plans for new garbage plant within short time.

Meadville, Pa.—Crawford County Commissioners have decided to erect jail.—Capt. W. H. Smith is interested.

Philadelphia, Pa.—Abandoning project to build elevated railroad on 12th and 13th sts., the Philadelphia & Suburban Elevated Railroad Company has announced its purpose to construct subway line under Broad st. from the City Hall to Cumberland st. to connect with elevated lines on Germantown, Lehigh and Kensington aves., as outlined in the original plans.

Philadelphia, Pa.—Extensive plans are being completed for building concrete pier at Penn Treaty Park, which will block the Government in its purpose to erect an immigration station on Neafie & Levy site.

Richmond, Va.—Committee on Improvement of James River has recommended to Council construction of public city wharf at mouth of Gillie's Creek.

TRADE NOTES

Cast-Iron Pipe.—Chicago: Market is quiet. Quotations: 4-inch, $28.50; 6 to 12-inch, $27.50; 16-inch and up, $26.50. Birmingham: A steady movement of stock is reported. Quotations: 4 to 6-inch, $26; 8 to 12-inch, $25; over 12-inch, average, $24. New York: Business now being booked for next year is of good proportions, and there are many inquiries regarding good-sized lots. All indications point to a large year's business for 1910. Quotations: 6-inch, carload lots, tidewater, $26.

Lead.—Outside interests have reduced their price to that asked by the American Smelting and Refining Company, which is 4.40c. There are no reports of shading, but the market is weak, and it has been an easy matter all week to do business on that basis. In St. Louis the market is not very firm at 4.27½c.

Receivers for Road Makers.—Urner G. Carl, Austin A. Wilson and James E. Macbeth of Cumberland, Md., were appointed receivers for William Hootman and Harry Hootman, trading as Hootman Brothers, who had the contract to build the State road on the Baltimore pike from Cumberland six miles east, but threw up the contract and left suddenly, with unsatisfied creditors. The receivers were appointed by Judge Morris of Baltimore, after application in the United States Court on behalf of twenty-five employees of Hootman Brothers, who were not paid. The contractors had accomplished the most difficult part of the work when they threw it up, having reported that they were advised that the contract was a losing one. They abandoned valuable machinery and equipment, which the court orders to be sold speedily. The bond of the receivers was approved by Albert A. Doub, referee in bankruptcy.

Crematory Designing.—William F. Morse, consulting sanitary engineer, has opened an office in the Trinity Building, 111 Broadway, New York, N. Y. For more than twenty years Mr. Morse has been actively engaged in the designing and constructing of apparatus, and the institution of methods for the collection, treatment and disposal of municipal, institutional, business and trade waste and refuse of every kind and class. During this time he has been identified with the inception and progress of sanitation, especially in connection with the subject of waste disposal.

Calendar.—The Edison Portland Cement Company, New Village, N. J., has issued a large, clearly printed wall calendar for 1910, suitable for use in warehouses or large offices where it is desirable that it may be read at a considerable distance. The sheet for each month carries a brief quotation from some authority regarding some point about cement or its use.

Enamel Signs.—The Ingram-Richardson Mfg. Company, Beaver Falls, Pa., manufacturer of porcelain enameled iron signs, furnished the iron signs posted on the New York *Herald*-Atlanta *Journal* good roads campaign. The signs are put up all the way from New York to Roanoke, Va., being posted every half-mile between these two cities. The company has received a contract from the State of Pennsylvania for 40,000 automobile tags for 1910; also similar contracts for tags from Connecticut, Michigan and New Jersey.